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Armond Stone

NOT NEEDED

University of Cincinnati.

⋈ PUBLICATIONS ⋈

OF THE

Cincinnati Observatory.

10

Double Stars

1882-6.

PUBLICATIONS OF THE CINCINNATI OBSERVATORY.

MICROMETRICAL MEASUREMENTS

OF

DOUBLE STARS,

1882-6,

MADE WITH

THE 11-INCH EQUATORIAL.

PREPARED FOR PUBLICATION

By H. C. WILSON, ASSISTANT ASTRONOMER.

CINCINNATI:

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INTRODUCTION.

SINCE the beginning of the year 1882, the work of measuring double stars has been carried on only at intervals when the observer's time was not occupied with other clases of observation. Since September, 1884, only moonlight nights have been devoted to this work; so that very few of the fainter class of doubles could be measured. The working list, prepared by Professor Stone, in 1881, contained all of the known and suspected binaries between the equator and 30° of south declination, a selected list of fixed doubles, for investigation of personal equation, and a few from the old working lists, which were still unmeasured. To these I have added all of the doubles which have been discovered at Cincinnati Observatory, and a number of stars from recent publications, which seemed to require further attention. The measures have been made by myself, with the exception of a few, which are indicated in the foot-notes, made by Professor Stone, in the winter of 1881–82.

A new determination of the value of a revolution of the micrometer screw was made in October, 1884, by Professor Porter and myself. A large number of transits and differences of declination of the *Pleiades* gave for the value of one revolution 13″.59. This value has been used in the reduction of all of the observations in this number. As a rule the achromatic eye-piece, designated *A*, has been employed. Occasionally lower powers were used. The magnifying powers are:

EYE-PIECE.	MAGNIFYING POWER.
I	95
II	150
III	230
A	450
P	450

P designates a periscopic eye-piece, which was occasionally used.

METHOD OF OBSERVING.

I have endeavored to make the observations symmetrical, and in such a manner that in each measure the parts of the instrument used should be moved in opposite directions, thus eliminating, as far as possible, the instrumental errors. The following is the invariable order of observing: The stars being placed in the center of the field of view, the two movable wires were set a few seconds apart, and approximately parallel to the line joining the stars, and the light adjusted. The position circle was then clamped and the tangent-screw turned quickly backward a few revolutions. The

right eye was then applied to the telescope, the head inclined so as to place the eyes either normal or parallel to the line joining the stars, the tangent-screw moved slowly forward until the observer was satisfied that the wires were parallel to the line joining the stars, care being taken that the stars should bisect the space between the wires. The position and hour circles were then read and recorded, the tangent-screw was moved quickly forward a few revolutions, and a second measure taken in the same manner, except that the left eye was used, and the tangent-screw turned in the opposite direction.

The micrometer was then turned through 90° on the position circle, and clamped. The micrometer screw having a divided head was set at 40.0 revolutions, with a forward motion, while the dummy screw was turned so as to place its wire on the side of the field opposite the divided head. The first bisection was made by moving the dummy wire toward the micrometer wire until both stars were judged to be bisected, then the micrometer wire was moved forward past the dummy until the wires should again bisect both stars. The reading was then taken and recorded, the micrometer screw again set at 40.0 revolutions—this time with backward motion, the dummy wire placed on the other side of the center, and a second measure taken in the same manner, but with opposite motion of both screws. In these measures also the eyes were placed either parallel or normal to the line joining the stars, and the right eye was used for measures involving forward motion, and the left eye for those involving backward motion of the micrometer screw. The position of the eyes, eye-piece, estimated position angle, distance and magnitudes of the stars, were then recorded, with such notes as were thought necessary.

The zero of the position circle was determined on each night by placing the micrometer wire parallel to the diurnal motion of a star.

Generally the stars have been observed with the eyes in both positions, normal and parallel, sometimes on the same night, but more frequently on different nights. I have taken the means of the forward and backward measures in each position, and have given the results separately in the seventh and ninth columns. The fifth column gives the position of the eyes, n designating normal and p parallel.

All of the observations were made within an hour of the meridian; so that no correction need be applied for refraction or position of the instrument.

INVESTIGATION OF PERSONAL EQUATION.

The only corrections applied to the observations were for my personal equation between normal and parallel measures. To determine this personal equation I selected those stars which had been observed in both positions on the same night. As all the observations were made near the meridian, the angle with the vertical (V) may be assumed the same as the position angle (P).

Following the method employed by Professor Stone (Introduction to Publications of Cincinnati Observatory, No. 5, page viii), and expressing the personal equation of an observation of position angle by the formula:

$$\varepsilon = \alpha + \beta\, w + \gamma\, w^2 + \ldots\ldots$$

where α, β, γ, etc., depend upon the observer, the manner of observing, and the angle with the vertical and w is the reciprocal of the visual angle, and arranging the observations in groups according to the angle with the vertical, the following set of equations was obtained:

V, or $V-180°$	$n-p$.	No. of Comparisons.
° 0	° ... °	...
25	$\varepsilon =$ −0.7 −3.4 w	35
45	−0.4 −4.5 w	36
65	−0.3 −3.3 w	26
90	...	...
115	+0.3 +4.2 w	35
135	+0.0 +4.7 w	33
155	+1.0 +2.1 w	23
180	...	...

Observations made with power *I* were included, giving them a weight proportional to the square root of the magnifying power in terms of *A*.

Unfortunately in the case of doubles near 0° and 90° of position angle the head may be turned in two directions for the same position of the eyes, and I had neglected to note in which direction I had turned my head in any such case. The differences $n-p$, therefore, came out very discordant as to signs; so that I had to omit all the stars in those groups. We may assume, however, that normal measures at 0°, and parallel measures at 90°, are practically correct, and that at 45° the error is equally divided between normal and parallel. Under this assumption the following table of provisional corrections was obtained by interpolation:

V, or $V-180°$	Normal.	Parallel.
° 0	° ... °	° ° ±0.8 ±2.8 w
25	+0.1 +1.0 w	−0.6 −2.4 w
45	+0.2 +2.2 w	−0.2 −2.3 w
65	+0.3 +2.4 w	−0.0 −0.9 w
90	±0.3 ±3.7 w	...
115	−0.3 −3.0 w	+0.0 +1.2 w
135	−0.0 −2.4 w	+0.0 +2.3 w
155	−0.3 −0.5 w	+0.7 +1.6 w
180	...	±0.8 ±2.8 w

The corrections found by means of these formulæ were applied to the observations made with power *A*. From the means of the corrected observations for each star the individual uncorrected observations were subtracted.

The differences thus obtained are given in the following tables, arranged in groups according to position, angle, and distance:

NORMAL.

v.	0°—30°	No.	30°—60°	No.	60°—90°	No.	90°—120°	No.	120°—150°	No.	150°—180°	No.
″ ″	°		°		°		°		°		°	
0—2	+0.3	8	+1.2	18	+4.3	4	—4.2	10	—2.0	15	—0.4	11
2—8	+0.2	16	+0.9	20	+1.4	15	—1.4	15	—0.6	25	—0.4	16
8—32	+0.2	12	+0.5	13	+0.9	6	—0.6	5	—0.3	16	—0.2	6

PARALLEL.

v.	0°—30°	No.	30°—60°	No.	60°—90°	No.	90°—120°	No.	120°—150°	No.	150°—180°	No.
″ ″	°		°		°		°		°		°	
0—2	—3.8	8	—2.2	18	—0.7	4	+0.8	10	+1.6	15	+3.6	11
2—8	—1.6	16	—0.9	20	—0.4	15	+0.4	15	+0.3	25	+1.6	16
8—32	—0.8	12	—0.5	13	—0.1	6	+0.2	5	+0.2	16	+0 7	6

It will be seen that the corrections in the first quadrant are virtually the same as those in the second quadrant, in reverse order and with opposite signs; also, that the normal corrections in the first quadrant are the same as the parallel corrections in the second quadrant, and *vice versa*. This result should be expected from symmetrical observations, and from the method by which the provisional corrections were obtained.

We may, therefore, combine all of the corrections into three groups, which depend upon the angle of inclination of the head, and if the mean distances of the three groups, according to distance, be assumed, as 1″, 5″, and 16″, we obtain the results in the following table:

	15°	No.	45°	No.	75°	No.
″	°		°		°	
1	±0.6	33	±1.8	66	±4.0	32
5	±0.3	62	±0 7	90	±1.5	62
16	±0.2	30	±0.4	58	±0.8	29

The sign + applies when the head is inclined to the left, and the sign — when the head is inclined to the right. In these groups the corrections are approximately proportional, directly to the angle, and inversely to the square root of the distance. They may, therefore, be represented with a sufficient degree of accuracy by the general formula,

$$c = a\, l\, \sqrt{w},$$

in which l represents the angle of inclination of the head, and a is the only coefficient to be determined. By applying this formula to all of the

observed differences, the following values of a were obtained for the three groups:

15°	$a = +0.040$
45	$a = +0.038$
75	$a = +0.043$
MEAN	$a = +0.040$

The agreement between these values is very satisfactory, and a may be assumed constant.

The following table, computed by means of the formula,

$$c = +0.040\ l\ \sqrt{w},$$

gives the corrections to be applied to my observed position angles. The arguments are the distance and the angle with the vertical, and since the observations were all made near the meridian,

$$V = P, \text{ or } P - 180°.$$

Eyes Normal. Argument = V.	1″	2″	4″	6″	9″	16″	25″	Eyes Parallel. Argument = V.
°	°	°	°	°	°	°	°	°
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90
10	+0.4	+0.3	+0.2	+0.2	+0.1	+0.1	+0.1	100
20	+0.8	0.6	0.4	0.3	0.3	0.2	0.2	110
30	+1.2	0.8	0.6	0.5	0.4	0.3	0.2	120
40	+1.6	1.1	0.8	0.6	0.5	0.4	0.3	130
50	+2.0	1.4	1.0	0.8	0.7	0.5	0.4	140
60	+2.4	1.7	1.2	1.0	0.8	0.6	0.5	150
70	+2.8	1.9	1.4	1.1	0.9	0.7	0.6	160
80	+3.2	+2.1	+1.6	+1.3	+1.1	+0.8	+0.6	170
90	±3.6	±2.4	±1.8	±1.5	±1.2	±0.9	±0.7	0
100	−3.2	−2.1	−1.6	−1.3	−1.1	−0.8	−0.6	10
110	−2.8	1.9	1.4	1.1	0.9	0.7	0.6	20
120	−2.4	1.7	1.2	1.0	0.8	0.6	0.5	30
130	−2.0	1.4	1.0	0.8	0.7	0.5	0.4	40
140	−1.6	1.1	0.8	0.6	0.5	0.4	0.3	50
150	−1.2	0.8	0.6	0.5	0.4	0.3	0.2	60
160	−0.8	0.6	0.4	0.3	0.3	0.2	0.2	70
170	−0.4	−0.3	−0.2	−0.2	−0.1	−0.1	−0.1	80
180	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90

Since the visual angle, or apparent distance, between the stars is proportional to the magnifying power of the eye-piece employed, it follows that, for measures made with other eye-pieces than *A*, the above corrections must be divided by the square root of the magnifying power expressed in units of the magnifying power of *A*.

The observed and corrected position angles are given side by side in the seventh and eighth columns of the printed results.

The comparison of the normal and parallel measures of distance made on the same nights gave the following results:

$n-p$.

v.	0°	No.	45°	No.	90°	No.	135°	No.
″ ″	″		″		″		″	
0—2	—0.07	7	—0.03	13	+0.08	2	—0.01	13
2—8	—0.05	12	0.00	21	+0.10	14	—0.03	26
8—32	—0.15	15	+0.01	12	+0.06	2	+0.03	7
MEAN	—0.09	34	0.00	46	+0.08	18	0.00	46

These differences do not appear to vary with the distance, but do show considerable change with the angle. The fact that the parallel measures are the greater at 0°, and that the normal measures are the greater, by the same amount, at 90°—*i. e.*, the measures in which the head is inclined most are largest—would seem to indicate that the inclination of the head produces a tendency to exaggerate distances, while the fact that measures are equal at 45° and 135°, where the inclination of the head is equal in either direction, would seem to show that no effect is produced upon the distances by the different relative positions of the eyes and stars.

COMPARISON WITH THE MEASURES OF OTHER OBSERVERS.

For this comparison the means of the corrected measures of those stars which show no indications of motion were used. The only previous observations of southern double stars, which were available and sufficiently numerous for this purpose, were those of W. Struve (Mensuræ Micrometricæ), Baron Dembowski (a manuscript in the library of Cincinnati Observatory and various numbers of the Astronomische Nachrichten), Mr. S. W. Burnham (Memoirs of the Royal Astronomical Society, Vols. XLIV and XLVII), and the Cincinnati observers (Publications of Cincinnati Observatory, Nos. 4, 5, and 6). The position angles were reduced, for precision, to the epoch 1885; but in no case did the correction amount to more than 0.3°. The results of the comparison are given in the following tables, arranged in groups, according to position angle and distance:

COMPARISON OF POSITION ANGLES.

P. A.	*W.*—Σ	No. of Comp.	*W.*—*De.*	No. of Comp.	*W.*—β	No. of Comp.	*W.*—*C. O.*	No. of Comp.
°	°		°		°		°	
0	—0.1	23	+0.4	20	+0.7	5	+0.6	46
45	+0.8	10	—0.9	11	—1.3	10	+1.1	44
90	+0.6	12	—0.5	13	+1.0	9	+0.7	43
135	+0.7	12	+0.8	16	+1.1	9	+1.3	45
MEAN	+0.5		0.0		+0.4		+0.9	

△	*W.*—Σ	No.	*W.*—*De*	No.	*W.*—β	No.	*W.*—*C. O.*	No.
″	°		°		°		°	
1—2	+0.6	6	+0.6	12	+0.5	8	+1.8	38
2—4	—0.1	17	+0.1	17	—0.4	10	+0.7	42
4—8	+1.1	11	—0.4	12	+0.3	6	+0.8	39
8—16	+0.1	16	0.0	14	—0.1	8	+0.7	38
16—32	+0.3	7	+0.1	5	...	...	+0.8	21
MEAN	+0.4		+0.1		+0.1		+0.9	

COMPARISON OF DISTANCES.

P. A.	*W.*—Σ	No.	*W.*—*De.*	No.	*W.*—β	No.	*W.*—*C. O.*	No.
°	″		″		″		″	
0	+0.11	23	+0.18	20	+0.07	5	+0.05	46
45	+0.19	10	+0.15	11	+0.21	10	+0.07	44
90	+0.19	12	+0.25	13	+0.16	9	+0.07	43
135	+0.16	12	+0.19	16	+0.19	9	+0 03	45
MEAN	+0.16		+0.19		+0.16		+0.05	

△	*W.*—Σ	No.	*W.*—*De.*	No.	*W.*—β	No.	*W.*—*C. O.*	No.
″	″		″		″		″	
1—2	+0 02	6	+0.09	12	+0.22	8	+0.08	38
2—4	+0.09	17	+0.14	17	+0.07	10	+0.03	42
4—8	+0.30	11	+0.33	12	+0.10	6	+0.09	39
8—16	+0.25	16	+0.30	14	+0.39	8	+0.10	38
16—32	—0.05	7	—0.02	5	...	...	—0 05	21
MEAN	+0 12		+0.17		(+0.19)		+0.05	

In the introduction to Publications of Cincinnati Observatory, No. 5 (page xix), Professor Stone has found, by comparison with the corrected measures of Σ, that the position angles contained in Publication No. 5, require a constant correction of about +0.6°. This will explain, in part at least, the nearly constant difference between my measures of position angle and those of the previous Cincinnati observers, as indicated by the column *W.*—*C. O.* Between the other observers and myself the differences are not so marked; and it would appear from the first two of these tables that my systematic errors in the measurement of position angles have been satisfactorily eliminated.

In the last two tables, on the other hand, all the comparisons conspire to show that my measures of distance, except for large distances, are too great, and the close agreement between Σ, *De*, and β is quite remarkable. It is interesting to compare the differences in the last table with the following corrections to the distances of Σ, *De*, and *C. O.*, derived by

comparison with *O Σ*'s results (see Obs. de Poulkova, Vol. IX, pp. 131 and 141, and Pub. Cin. Obs., No. 5, p. xxii):

CORRECTIONS ACCORDING TO O Σ.

△	*Do*—Σ	*Do*—*De.*	*Do*—*C. O.*
″	″	″	″
1.6	0.00	+0.02	+0.08
2.9	+0.14	+0.14	+0.20
5.6	+0.22	+0.22	+0.22
12.0	+0.19	+0.20	+0.06
23.9	+0.08	+0.06	—0.16
MEAN	+0.13	+0.13	+0.08

If we subtract the differences (W—Σ), etc., from the corrections (*Do*—Σ), etc., we will obtain the corrections (*Do*—*W.*) required to reduce my own measures to *O Σ*'s standard. The values of (*Do*—*W.*), derived from the three sets of comparisons, are somewhat discordant, but, on the whole, seem to show that my measures of distance require no systematic correction to reduce them to the standard of *O Σ*. The last column in the following table is the mean of the three preceding columns:

△	(*Do*—Σ). (*W*—Σ).	(*Do*—*De.*) (*W*—*De.*)	(*Do*—*C. O.*) (*W.*—*C. O.*)	*Do*—*W.*
″	″	″	″	″
1.6	—0.02	—0.07	0.00	—0.03
2.9	+0.05	0.00	+0.17	+0.07
5.6	—0.08	—0.11	+0.13	—0.02
12.0	—0.06	—0.10	—0.04	—0.07
23.9	+0.13	+0.08	—0.11	+0.03
MEAN	0.00	—0.04	+0.03	0.00

PROBABLE ERROR OF A SINGLE OBSERVATION.

For the discussion of probable error, those stars were selected which had been observed on two or more nights, and with the eyes both normal and parallel. From the corrected results of the observations made with power *A*, the probable error of a single observation was found for each star by Peter's formula,

$$\varepsilon = 0.8453 \frac{\Sigma (v)}{\sqrt{n (n-1)}},$$

where n is the number of observations of the star, $\Sigma (v)$ the sum of the differences between the individual measures and their arithmetical mean, without regard to sign, and ε the probable error of a single measure. In the following table the means of the probable errors for the groups, according to distance, 0.5″—1″, 1″—2″, 2″—4″, 4″—8″, 8″—16″, and 16″—32″, are

given; ε represents the probable error of an observed distance, and f that of an observed angle; g is f expressed in seconds of arc. $= \triangle \sin. f$:

$\triangle$	$\Sigma \sqrt{n\,(n-1)}$	ε	$\Sigma \sqrt{n\,(n-1)}$	f	g
″		″		°	″
0.75	5.6	0.112	11.8	1.90	0.025
1.55	37.8	0.104	59.7	1.17	0.040
3.14	57.9	0.122	73.4	0.77	0.053
6.43	70.3	0.146	89.8	0.57	0.063
11.79	40.3	0.165	61.3	0.50	0.102
19.62	9.4	0.130	10.4	0.33	0.113

It will be seen that the measures of position angle are considerably more accurate than those of distance, especially for the closer doubles.

ABBREVIATIONS.

THE following abbreviations, most of which are in common use among double-star observers, are frequently employed in this volume:

A. C.	denotes	Alvan Clark.
A. G. C.	"	Alvan G. Clark.
Arg. S.	"	F. W. A. Argelander, Bonn Observations, Vol. II.
β	"	S. W. Burnham.
C_4	"	Publications of Cincinnati Observatory, No. 4.
C_5	"	Publications of Cincinnati Observatory, No. 5.
C_6	"	Publications of Cincinnati Observatory, No. 6.
Da.	"	W. R. Dawes.
De.	"	Baron Dembowski.
Du.	"	N. C. Duner.
$\triangle$	"	James Dunlop.
Eng.	"	R. Engelmann.
Fl.	"	J. Fletcher.
Gl.	"	Joseph Gledhill.
h	"	Sir John Herschel.
H	"	Sir William Herschel.
H. A. H.	"	H. A. Howe.
H. C. O.	"	Harvard College Observatory, Annals, Vol. XIII.
H. V. E.	"	H. V. Egbert.
Ja.	"	W. S. Jacobs.
Mä.	"	J. H. Mädler.
Mit.	"	O. M. Mitchel.
O. S.	"	Ormond Stone.

O Σ	denotes	Otto Struve.
Pi.	"	G. Piazzi.
Po.	"	E. B. Powell.
Sch.	"	J. V. Schiaparelli.
S.	"	Sir James South.
Se.	"	A. Secchi.
Sh.	"	South and Herschel.
Sm.	"	W. H. Smyth.
Sp.	"	G. Spörer.
Σ	"	F. G. W. Struve.
W.	"	H. C. Wilson.
W. & S.	"	Wilson and Seabroke.
W. U.	"	Winslow Upton.

NEW DOUBLE STARS.

No special search has been made for new doubles, but a few have been picked up in the routine of observing known pairs. They will be found scattered among the observations, and are designated *H. C. W.* The following list contains, probably, all that are worthy of measurement:

No.	R. A.	Decl.	P. A.	Dist.	Magnitudes.	Date when discovered.
	H. M.	° ′	°	″		
1	0 45	—18 10	115	0.3	8.0 8.5	Oct. 26, 1885
2	1 12	—23 20	60	9	8.0 9.5	Sept. 18, 1885
3	5 00	—20 00	185	8	9.0 12.0	Nov. 27, 1883
4	15 30	—20 00	100	1.5	9.5 9.5	April 25, 1884
5	15 41	—19 16	0	0.5	9.0 9.0	April 13, 1885
6	17 09	—18 03	290 226	1.0 10.	9.0 9.1 10.	June 16, 1884
7	19 28	—16 30	160	5	8.0 8.2	Aug. 18, 1885
8	19 56	—23 10	220	5	8.0 10.0	Aug. 24, 1883
9	20 23	—23 27	160	6	8.5 10.0	Aug. 24, 1883
10	21 04	—23 11	45	8	8.5 9.0	Aug. 23, 1883
11	21 45	—23 25	340	0.5	7.5 7.5	Aug. 28, 1883
12	22 07	—21 40	120	5	6.0 7.0	Sept. 3, 1883
13	22 38	—22 10	20	1	8.0 9.5	Sept. 3, 1883

The positions given are very rough, but are probably within one or two minutes of right ascension and 10′ of declination.

H. C. WILSON, Assistant Astronomer.

June, 1886.

MICROMETRICAL MEASUREMENTS

OF

DOUBLE STARS,

1882–86.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs	Corr.				
		H. M. S.	° ′			°	°	″			
1	Σ 3063	0 01 28	— 5 13	p	A	223.1	221.7	1.92	...		82.760
2	...	...	...	n	A	221.4	222.5	1.79	8.5	9.0	82.760
3	...	...	...	p	A	219.4	218.0	1.82	...		85.815
4	...	...	...	n	A	218.7	219.8	1.63	8.0	9.0	85.815
5	...	...	...	p	A	220.5	219.1	1.85	...		85.820
6	...	...	...	n	A	218.4	219.6	1.78	8.0	8.5	85.820
7	O. S. 51	0 03 28	—14 51	p	A	288.1	288.3	9.32	...		85.773
8	...	...	...	n	A	289.3	288.4	...	8.0	8.2	85.773
9	...	...	...	n	A	109.0	108.1	...	...		85.793
10	...	...	...	p	A	108.6	108.8	9.35	8.5	8.7	85.793
11	Σ 23	0 11 20	— 0 21	n	A	349.6	349.5	7.37	8.0	9.5	82.760
12	...	...	...	n	I	348.1	348.0	7.82	...		82.842
13	...	...	...	p	I	349.7	347.2	...	...		82.842
14	...	...	...	n	A	350.1	350.0	7.62	8.0	9.0	82.842
15	...	...	...	n	A	348.2	348.1	7.43	7.0	8.5	84.924
16	...	...	...	n	A	348.1	348.0	7.16	...		85.815
17	...	...	...	p	A	347.8	348.9	...	6.0	8.0	85.815
18	...	...	...	n	A	347.3	347.2	7.11	7.0	8.5	85.820
19	...	...	...	n	A	347.0	346.8	6.94	8.0	9.0	85.861
20	h 3429	0 15 48	—23 40	n	A	21.0	21.3	6.34	8.0	9.0	82.702
21	...	...	...	p	A	23.8	22.7	...	...		82.702
22	O. S.	0 21 44	—17 37	p	II	275.0	275.1	6.01	9.5	11.0	84.886
23	...	...	...	p	A	278.2	278.2	5.86	8.5	10.5	85.716
24	...	...	...	p	A	278.1	278.2	5.68	8.0	11.0	85.793
25	h 3377	0 28 04	—26 37	p	A	57.5	57.2	18.35	...		82.760
26	...	...	...	n	A	57.3	57.7	18.40	7.5	9.0	82.760
27	h 2000	0 46 06	—15 30	p	A	115.4	115.6	16.85	9.0	10.5	85.773
28	...	...	...	p	A	115.2	115.5	17.50	...		85.861

21. Def. very poor.——22. Too faint.——23. Distance very poor.——24. Very faint; def. good.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
29	h 2000	0 46 06	—15 30	n	A	117.6	117.0	...	9.0	11.0	85.861
30	O. S. 52	0 46 20	— 23 16	p	A	273.3	273.4	2.46		...	82.842
31	...	...	...	n	A	275.8	273.5	2.39	7.5	8.5	82.842
32	...	...	...	p	A	273.1	273.2	2.26	8.0	8.5	84.886
33	...	...	...	p	A	272.6	272.7	2.14	7.0	7.5	85.716
34	β 734	0 46 47	—24 40	n	A	345.6	345.4	11.37	6.0	10.0	82.705
35	...	...	...	p	A	345.9	345.0	...		...	82.705
36	...	...	...	n	A	344.7	344.6	11.00	6.0	9.0	82.760
37	...	...	...	p	A	345.6	344.7	11.19	5.0	9.5	82.787
38	β 233	0 49 09	—18 06	p	A	91.3	91.3	1.53	9.0	10.5	84.886
39	...	...	...	p	A	92.5	92.5	1.00	8.0	8.5	85.773
40	...	...	...	p	A	89.7	89.7	1.41	8.0	9.5	85.820
41	S 390	0 52 11	—16 20	p	A	216.4	215.5	6.71	8.0	8.2	82.702
42	...	...	...	n	A	216.1	216.6	6.65		...	82.702
43	...	...	...	p	I	215.3	213.3	6.74		...	82.702
44	...	...	...	n	I	215.3	216.4	6.77		...	82.702
45	...	...	...	p	A	34.4	213.5	6.32		...	85.716
46	...	...	...	n	A	35.7	216.2	6.32	7.0	7.0	85.716
47	...	...	...	p	A	216.0	215.1	6.37		...	85.815
48	...	...	...	n	A	215.6	216.1	6.26	6.5	7.0	85.815
49	β 234	0 54 36	—17 43	n	A	152.5	152.0	4.72	8.5	8.5	84.924
50	Σ 86	0 58 43	— 6 07	n	A	340.0	159.8	12.93	8.0	8.0	82.787
51	...	...	...	p	A	158.9	159.7	13.24	8.0	8.5	82.842
52	...	...	...	n	A	338.2	158.0	12.77		...	85.820
53	...	...	...	p	A	338.2	158.8	12.68		...	85.820
54	...	...	...	n	A	159.4	159.1	12.73		...	85.861
55	...	...	...	p	A	158.0	158.7	...	8.0	8.5	85.861
56	Σ 101	1 07 54	— 8 15	n	A	341.3	341.1	20.78	7.0	9.5	82.787

35 and 36. Def. very poor.——37. Def. good.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
57	Σ 101	1 07 54	— 8 15	p	A	340.2	340.9	21.04	7.5	9.0	82.842
58	...	...	...	n	A	341.6	341.4	20.77	8.0	10.0	85.773
59	...	...	...	n	A	341.9	341.7	20.62		...	85.820
60	...	...	...	p	A	340.7	341.4	...	8.0	10.0	85.820
61	H. A. H.	1 09 34	—23 33	n	A	141.5	141.1	15.28		...	84.886
62	...	...	...	p	A	141.6	142.0	...		...	84.886
63	...	...	...	n	A	141.0	140.6	14.43	8.0	10.5	85.765
64	...	...	...	p	A	140.4	140.8	...		...	85.765
65	...	...	...	p	A	140.1	140.6	14.31		...	85.795
66	...	...	...	n	A	142.8	142.4	...	8.0	10.5	85.795
67	H. A. H. 2	1 11 18	—23 33	p	A	288.1	288.2	7.62	8.0	9.0	85.716
68	...	...	...	p	A	289.4	289.5	7.45	8.0	9.0	85.773
69	H. C. W.	1 12	—23 20	p	A	62.5	62.2	9.32		...	85.716
70	...	...	...	n	A	61.4	62.2	9.72	8.0	10.0	85.716
71	...	...	...	p	A	59.7	59.4	9.16		...	85.773
72	...	...	...	n	A	60.6	61.4	...	8.0	9.5	85.773
73	Σ 110	1 11 46	—12 59	n	A	356.0	356.0	7.61		...	82.804
74	...	...	...	p	A	354.1	355.4	...	7.0	7.3	82.804
75	...	...	...	n	I	356.2	356.2	7.91		...	82.845
76	...	...	...	p	I	355.9	358.6	...		...	82.845
77	Σ 113	1 13 40	— 1 08	n	A	348.7	348.3	1.56	6.5	7.0	82.787
78	h 2036	1 14 04	—16 26	n	A	24.9	25.7	1.87		...	82.787
79	...	...	...	p	A	28.3	26.3	1.88	7.0	7.3	82.787
80	...	...	...	p	A	26.6	24.6	...		...	84.924
81	...	...	...	n	A	23.0	23.8	1.65	8.0	8.5	84.924
82	...	...	...	n	A	23.1	23.9	1.38	7.0	7.5	85.820
83	Σ 125	1 20 50	— 0 46	n	A	350.9	350.8	32.14	7.0	9.0	82.787
84	...	...	...	p	A	350.4	350.9	32.18	7.0	9.5	82.845

69. Position approximate.——80 and 81. Windy.- 82. Def. good.——84. Too blurry.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
85	Σ 125	1 20 50	— 0 46	n	I	349.9	349.9	32.91	...		85.831
86	...	...	...	n	A	350.2	350.2	32.91	7.5	10.0	85.831
87	H. A. H. 54	1 27 47	—12 50	n	A	330.2	328.9	0.87	...		85.773
88	...	...	...	p	A	328.0	330.4	...	8.0	8.5	85.773
89	...	...	...	n	A	315.0	...	...	8.0	9.0	85.795
90	...	...	...	n	A	332.2	331.0	...	...		85.820
91	...	...	...	p	A	326.9	329.4	0.88	8.0	9.0	85.820
92	H. A. H.	1 27 52	—12 25	n	A	31.0	31.4	13.32	...		84.924
93	...	...	...	p	A	32.2	31.4	13.82	8.0	9.0	84.924
94	...	...	...	n	A	29.6	30.0	...	...		85.765
95	...	...	...	n	A	31.5	31.9	13.04	...		85.831
96	...	...	...	p	A	32.7	32.0	...	8.5	9.5	85.831
97	H. C. W.	1 33	—18 24	p	A	72.9	73.0	23.90	9.0	9.5	82.702
98	...	...	...	n	A	74.3	73.5	...	...		82.702
99	Σ 147	1 35 49	—11 55	p	A	85.5	85.4	4.26	5.0	7.0	81.721
100	(*χ′ Ceti*)	...	..	p	A	87.6	87.5	3.65	7.0	7.0	82.760
101	...	...	...	p	I	85.4	85.2	3.64	...		82.804
102	...	...	...	n	I	86.1	87.8	...	6.5	7.0	82.804
103	...	...	...	p	A	89.9	89.9	3.70	7.0	8.0	84.927
104	...	...	...	p	A	87.9	87.9	3.32	6.0	7.0	85.716
105	*β* 183	1 47 21	—17 20	p	A	231.0	230.0	2.67	8.5	9.5	82.760
106	...	..	...	n	A	227.9	229.2	2.77	...		82.760
107	Sh. 24	1 53 24	—23 36	p	A	306.2	306.7	8.15	...		82.840
108	(*Ceti 292*)	...	...	n	A	305.2	304.4	8.14	7.0	7.5	82.840
109	...	...	...	p	I	304.8	305.8	8.20	...		82.840
110	...	...	...	n	I	305.5	303.8	8.03	...		82.840
111	Σ 231	2 06 39	— 2 57	p	A	231.4	231.0	15.77	4.0	8.0	82.702
112	(*66 Ceti*)	...	...	n	A	231.4	231.9	16.12	...		82.702

89. Def. too poor for distance.——92 and 93. Thin clouds passing.——94. Def. poor.——97. Observed for h 2067.——99. Observed by O. S.——101 and 102. Blurry.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
113	Σ 231	2 06 39	— 2 57	p	I	232.6	231.7	16.10	...		82.702
114	...	...	...	n	I	231.1	232.2	15.99	...		82.702
115	...	...	...	p	A	232.0	231.6	16.00	...		84.834
116	...	...	...	n	A	230.8	231.3	15.77	7.0	9.0	84.834
117	...	...	...	p	A	231.6	231.1	16.19	...		84.927
118	...	...	...	n	A	231.3	231.8	...	7.5	9.0	84.927
119	O. S. 55	2 12 12	—31 17	n	A	201.6	202.1	2.93	...		84.875
120	...	...	...	p	A	202.6	201.0	...	8.5	9.5	84.875
121	...	...	...	n	A	202.7	203.2	2.74	...		85.820
122	...	...	...	p	A	205.3	203.7	...	8.0	9.0	85.820
123	...	...	...	n	A	200.6	201.1	2.72	...		85.831
124	...	...	...	p	A	203.2	201.5	...	6.5	7.5	85.831
125	H. A. H. 3	2 25 46	— 8 05	p	A	211.1	209.5	2.53	...		85.820
126	...	...	...	n	A	206.6	207.3	2.18	9.3	9.5	85.820
127	...	...	...	n	A	27.4	28.1	2.11	9.0	9.5	85.831
128	Σ 280	2 28 09	— 6 10	n	A	346.0	345.6	3.68	...		82.842
129	...	...	...	p	A	346.9	348.6	3.61	7.5	8.0	82.842
130	...	...	...	n	I	347.5	346.9	3.51	...		82.842
131	...	...	...	p	I	346.8	350.3	...	...		82.842
132	...	...	...	n	A	346.2	345.9	3.59	8.0	8.2	84.834
133	h 3506	2 28 35	—28 46	p	A	244.7	244.4	10.88	...		84.834
134	...	...	...	n	A	243.7	244.5	10.76	7.0	9.0	84.834
135	Σ 295	2 35 05	— 1 12	n	A	324.0	323.4	4.78	6.5	10.0	84.831
136	(*84 Ceti*)	...	...	n	A	326.4	325.8	...	...		84.924
137	...	...	...	n	A	324.2	323.5	3.88	...		85.831
138	...	...	..	p	A	323.2	324.2	4.11	5.0	9.0	85.831
139	β 261	2 38 31	—28 25	p	A	101.2	101.6	2.90	...		84.834
140	...	...	...	n	A	103.2	101.4	...	8.5	10.0	84.834

117 and 118. Windy.——135. Blurry.——138. Companion has a ruddy color.——140. P. A. very poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
141	β 261	2 38 31	—28 25	p	A	98.1	98.4	2.89	...		84.875
142	...	...	...	n	A	99.5	97.8	...	7.5	9.0	84.875
143	...	...	...	p	A	100.2	100.4	2.86	7.0	8.5	85.820
144	H. A. H. 56	2 38 45	—28 57	n	A	352.4	352.2	4.21	9.0	9.5	84.850
145	Σ 323	2 46 15	+ 5 56	p	A	282.6	282.9	2.66	...		82.842
146	...	...	...	n	A	282.6	280.8	2.90	7.3	7.5	82.842
147	...	...	...	p	A	282.5	282.8	2.57	7.0	7.2	85.820
148	h 3535	2 44 42	—28 26	...	A	260.	...	elong.	...		83.831
149	...	...	...	...	A	90.	...	elong.	...		84.834
150	S 423	2 51 58	—25 27	p	A	222.7	222.3	27.55	...		84.834
151	...	...	...	n	A	221.9	222.2	27.56	8.0	8.5	84.834
152	Σ 334	2 52 57	+ 6 11	n	A	139.2	139.3	...	7.7	8.0	81.721
153	..	...	...	n	A	319.8	318.6	1.51	...		82.842
154	...	...	...	p	A	319.3	320.7	1.90	8.0	8.5	82.842
155	β 11	2 56 49	— 8 10	p	A	82.0	81.8	2.64	6.5	10.0	84.831
156	(9 Eridani)	...	...	n	A	85.	...	2.5	5.0	8.0	85.831
157	Σ 356	3 01 00	—13 47	n	A	13.2	13.1	15.93	7.0	9.0	81.746
158	O. S.	3 04 57	—23 11	n	A	176.8	176.7	5.10	10.0	10.5	84.875
159	...	...	...	n	A	358.9	178.9	4.66	10.0	10.0	85.831
160	h 3555	3 06 58	— 29 28	n	III	333.6	332.6	2.63	...		84.850
161	(12 Eridani)	...	...	p	III	328.3	330.5	...	5.0	9.0	84.850
162	...	...	...	n	A	322.4	321.7	2.02	...		84.875
163	...	...	...	p	A	320.3	321.9	2.33	5.0	8.5	84.875
164	Σ 367	3 07 52	+ 0 18	p	A	54.0	52.4	0.83	8.0	8.5	84.834
165	...	...	...	n	A	52.6	54.8	...	...		84.834
166	...	...	...	p	A	235.3	233.5	0.63	...		85.820
167	...	...	...	n	A	234.2	236.6	..	7.0	7.2	85.820
168	h 3563	3 11 54	—23 28	p	A	254.5	254.8	8.94	7.5	9.0	81.746

148. Estimates; def. poor; not divided.——149. Estimates; could not separate.— 152. O. S. observer.——156. Estimates; stars blurred.——157. O. S. observer.——158. Very faint.——160 and 161. Error of 10° in P. A.?——168. O. S. observer.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
169	τ^4 Eridani A. C.	3 14 11	—22 12	p	A	97.5	97.5	40.64	4.0	10.0	83.831
170	Σ 407	3 24 16	—11 33	n	A	44.9	43.8	...	9.0	11.0	83.831
171	...	...	...	p	A	43.1	44.2	2.77	8.5	11.0	84.831
172	...	...	...	p	A	42.9	44.0	2.70		...	84.875
173	...	...	...	n	A	43.4	42.4	2.71	8.0	9.5	84.875
174	Σ 408	3 24 42	— 4 41	n	A	337.6	336.9	1.80		...	84.834
175	...	...	...	p	A	335.1	337.1	...	8.5	8.7	84.834
176	...	...	...	n	A	337.4	336.7	1.33		...	85.820
177	...	...	...	p	A	336.1	338.1	1.29	7.0	7.2	85.820
178	Σ 422	3 30 38	+ 0 12	p	A	246.4	246.0	6.61	7.0	10.0	84.631
179	...	...	...	n	A	245.8	246.9	...	7.5	9.0	84.634
180	Σ 470	3 48 16	— 3 19	p	A	348.3	347.2	6.99		...	84.831
181	(*32 Eridani*)	...	...	n	A	346.4	346.6	6.99	7.0	8.0	84.831
182	...	...	...	n	III	347.4	347.1	7.06		...	85.059
183	...	...	...	n	I	348.2	347.8	6.74		...	85.062
184	β 541	3 48 53	— 1 37	p	A	261.3	261.0	1.41	9.0	11.0	84.831
185	H. A. H. 57	4 02 13	—29 08	n	A	169.5	169.1	1.21	8.5	8.7	84.875
186	H. A. H. 5	4 08 08	—28 51	p	A	37.1	35.7	2.46		...	84.875
187	...	...	...	n	A	36.2	37.0	2.37	7.4	7.5	84.875
188	Σ 518 A. D.?	4 09 52	— 7 47	n	A	121.4	121.7	35.18	3.5	11.0	81.735
189	Σ 518 B. D.?	...	...	p	A	274.8	275.1	...	8.0	11.0	81.735
190	Σ 536	4 16 13	— 4 58	n	A	161.2	160.5	1.76		...	84.832
191	...	...	...	p	A	160.8	162.8	...		...	84.832
192	...	...	...	n	A	160.8	160.1	1.88	8.0	9.0	85.062
193	...	...	...	n	A	160.9	160.2	1.77	9.0	9.5	85.082
194	Σ 544	4 19 06	— 9 02	n	A	352.8	352.7	2.51		...	84.831
195	...	...	...	p	A	357.3	355.1	...	8.5	9.5	84.831
196	β 311	4 21 54	—24 21	p	A	162.	...	...		...	83.907

170. Too indistinct for distance.——171. Blurry.——179. *A* seems single.——182. Very blurry.——188 and 189. O. S. observer.——196. Estimate; def. poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
197	O. S. 59	4 23 55	—25 28	n	A	350.3	350.2	7.76	8.0	9.5	83.908
198	...	...	...	n	III	347.9	347.7	7.63	...		85.059
199	Σ 564	4 27 42	—12 23	n	A	342.6	342.2	3.80	9.0	9.2	82.998
200	Σ 576	4 32 26	—13 16	n	III	171.5	171.3	12.34	7.0	8.0	85.059
201	H. A. H. 6	4 34 33	—20 08	p	A	95.9	95.9	3.20	8.7	9.3	81.745
202	Σ 590	4 37 50	— 9 01	n	A	136.8	136.2	9.34	6.0	6.0	82.998
203	(*55 Eridani*)	...	...	p	A	135.7	136.2	9.49	...		82.998
204	β 316	4 46 52	— 5 29	n	A	178.8	178.8	1.22	9.0	9.0	82.114
205	O Σ 91	4 49 57	+ 2 59	p	A	238.6	237.2	0.99	...		84.831
206	...	...	...	n	A	235.0	237.2	...	8.0	8.2	84.831
207	H. C. W.	4 59	—20 15	p	A	83.7	83.6	9.53	9.0	9.5	83.908
208	H. C. W.	5 00	—20 00	n	A	186.8	186.8	8.40	9.0	12.0	83.908
209	Σ 651	5 04 14	— 7 13	p	A	52.6	52.3	17.56	...		85.062
210	...	...	...	n	A	52.4	52.9	18.09	8.5	9.5	85.062
211	Σ 655	5 06 42	—12 01	n	II	338.5	338.0	...	...		82.092
212	(ι Leporis)	...	...	n	III	337.4	337.0	12.96	5.0	10.0	82.092
213	...	...	...	n	A	336.9	336.6	13.27	...		85.062
214	Σ 667	5 08 52	— 7 13	n	A	313.8	313.0	4.32	...		84.831
215	...	...	...	p	A	314.4	315.3	4.33	8.5	9.5	84.831
216	Σ 688	5 13 43	—10 52	p	A	274.6	274.6	10.50	△m = 0.1		85.062
217	D 6	5 22 58	— 3 24	p	A	83.4	83.8	0.59	7.2	7.8	82.114
218	...	...	...	p	A	83.8	83.5	0.78	8.0	8.0	82.114
219	Σ 725	5 23 38	— 1 11	p	A	85.6	85.9	12.73	5.0	8.5	81.745
220	Σ 735	5 27 01	— 6 35	n	III	353.5	353.5	38.73	8.0	9.0	86.168
221	Σ 734	5 27 04	— 1 48	n	A	355.6	355.6	1.82	7.0	8.5	86.133
222	H. C. W.	5 27	— 1 50	n	A	153.3	152.7	2.75	7.0	9.0	84.831
223	h 3766	5 27 16	—17 55	n	A	156.7	156.5	...	...		83.921
224	(α Leporis)	...	...	p	A	155.4	155.8	35.40	4.0	9.5	83.921

197. Def. very poor.——199. Difficult.——201. O. S. observer.——204. O. S. observer.——207 and 208. Positions approximate.——217. O. S. observer.——222. Observed for Σ 734.——223 and 224. Def. very poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
225	D 4	5 29 28	— 4 55	n	A	212.5	213.5	1.69	...		81.745
226	Σ 790	5 40 06	— 4 19	p	A	87.9	87.9	6.92	6.0	8.5	82.998
227	(Orionis 187)	...	...	p	A	88.6	88.6	6.99	7.0	9.0	86.133
228	S 504	5 53 19	—20 10	p	III	70.6	70.2	3.99	9.0	9.0	82.092
229	...	...	...	n	III	249.9	250.3	4.02	8.2	8.5	82.092
230	...	...	...	p	A	73.6	73.3	...	8.0	8.5	86.133
231	h 3830	6 00 43	—28 40	n	A	0.9	0.9	6.67	8.0	8.2	82.094
232	...	...	...	n	A	1.9	1.9	...	...		82.111
233	...	...	...	n	I	2.2	2.2	6.17	8.0	8.5	82.111
234	β 18	6 11 07	—12 00	p	A	276.8	276.9	1.77	7.0	9.5	85.144
235	Σ 3116	6 15 49	—11 43	n	A	21.1	21.5	4.26	6.5	9.5	82.125
236	h 3850	6 17	—14 33	p	A	43.0	43.4	15.58	...		83.921
237	H iv 81	6 31 08	—18 34	p	I	260.9	261.2	...	6.0	8.0	82.179
238	v^1 *Canis Majoris*	...	...	p	I	264.7	264.5	...	...		83.141
239	...	...	...	p	A	263.5	263.4	17.65	5.0	7.0	83.141
240	...	...	...	p	A	262.8	262.7	17.33	6.0	8.5	85.082
241	H. C. W.	6 37	—23 07	n	A	350.2	350.1	15.25	8.5	9.0	82.094
242	...	...	...	n	A	171.0	171.0	14.71	7.5	7.8	82.094
243	β 19	6 36 36	—15 54	n	A	169.3	169.1	3.66	7.5	10.5	85.144
244	...	...	...	n	A	168.5	168.3	3.50	7.5	9.0	86.168
245	A. G. C. 1	6 39 52	—16 33	p	A	41.2	41.4	9.66	1.0	7.0	81.743
246	(*Sirius*)	...	...	n	A	41.6	42.1	...	...		82.111
247	...	...	...	p	A	40.6	40.8	9.06	...		82.114
248	...	...	...	n	A	42.7	42.9	9.67	...		82.114
249	...	...	...	p	A	41.3	40.6	9.67	...		82.114
250	...	...	...	n	A	39.4	39.8	9.69	...		82.114
251	...	...	...	n	A	41.7	42.1	...	...		82.125
252	...	...	...	n	A	41.0	41.4	...	...		83.138

225. O. S. observer.——229. O. S. observer.——230. Blurry.——232. Blurry.——236. Def. very poor.——238 and 239. Def. poor.——242. O. S. observer.——245. O. S. observer.——247 and 248. O. S. observer.——251. Blurry.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs	Corr.				
		H. M. S.	° ′			°	°	″			
253	(*Sirius cont.*)	6 39 52	—16 33	p	A	41.9	41.2	...	...		83.138
254	...	...	...	n	II	35.6	36.1	...	...		83.943
255	...	...	...	p	A	37.8	37.1	8.78	...		84.089
256	...	...	...	n	A	37.6	38.0	8.81	...		84.089
257	...	...	...	n	A	33.2	33.7	8.39	...		84.220
258	...	...	...	p	A	35.8	35.1	...	...		84.220
259	...	...	..	p	A	31.5	30.7	...	...		85.082
260	...	...	...	n	A	29.2	29.7	7.74	...		85.082
261	...	...	...	p	A	33.5	32.7	...	...		85.144
262	...	...	...	p	A	34.2	33.7	...	...		85.226
263	...	...	...	n	A	30.2	30.7	...	...		85.226
264	...	...	...	n	A	(1.3)	...	(9.33)	...		86.103
265	...	...	...	n	A	(6.0)	...	...	...		86.127
266	...	...	...	n	A	31.6	32.1	...	...		86.127
267	...	...	...	n	A	27.3	27.7	...	...		86.133
268	...	...	...	p	A	32.1	31.1	...	...		86.149
269	...	...	...	n	A	27.4	27.9	6.99	...		86.149
270	...	...	...	n	A	29.7	30.2	...	...		86.171
271	...	...	...	p	A	27.3	26.3	...	...		86.179
272	...	...	...	n	A	25.2	25.7	6.60	...		86.179
273	Σ 971	6 42 50	—13 18	n	A	329.2	328.3	1.68	9.0	9.5	84.089
274	...	...	...	p	A	326.8	328.8	...	...		84.089
275	β 20	6 43 25	—16 05	n	III	29.9	30.6	2.96	8.0	11.0	86.157
276	S 538	6 44 39	—24 00	n	III	4.4	4.4	27.24	8.5	9.0	82.092
277	...	...	...	n	III	4.4	4.4	26.79	7.0	8.0	82.092
278	...	...	...	n	I	3.6	3.6	...	7.0	8.0	82.179
279	S 537?	6 44 46	—23 56	p	I	270.1	270.1	...	6.5	8.5	82.179
280	β 325	6 46 59	—26 26	n	A	35.5	36.5	2.06	...		84.089

264 and 265. Ghost?——271 and 272. Def. excellent. Is the principal star itself double, P. A. 130°± Δ 0.″3±?——277. O. S. observer.——279. O. S. observer; through clouds.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
281	β 325	6 46 59	—26 26	p	A	39.1	37.6	...	9.0	10.0	84.089
282	Σ 990	6 48 51	—14 06	p	A	278.3	278.5	3.27	9.0	10.0	84.089
283	ε Canis Majoris	6 53 54	—28 49	n	A	160.6	160.3	7.99	...		84.089
284	...	...	...	p	A	161.0	162.0	...	2.0	9.0	84.089
285	Σ 1011	6 55 24	—15 09	p	A	298.7	299.2	4.79	8.5	9.0	82.111
286	...	...	...	p	A	299.8	300.3	4.34	...		85.136
287	...	...	...	n	A	301.4	300.4	...	8.0	8.5	85.136
288	Σ 1031	7 03 05	—13 48	p	A	247.8	247.3	3.68	9.0	10.0	85.082
289	β 196	7 06 27	— 5 14	n	A	190.9	191.1	2.92	9.0	11.0	82.125
290	Σ 1049	7 07 58	— 8 43	p	A	45.8	44.8	3.79	...		86.133
291	...	...	...	n	A	39.8	40.7	...	8.0	9.0	86.133
292	h 3938	7 08 45	—22 42	p	A	250.8	250.7	19.78	7.0	9.5	85.144
293	Σ 1060	7 10 23	— 9 04	n	A	24.8	25.2	6.90	8.5	9.5	85.160
294	Jacob?	7 14 19	—36 31	n	A	207.8	208.4	3.18	9.0	10.0	84.089
295	O. S. 65	7 20 47	—18 08	p	A	77.0	76.7	4.92	8.5	10.0	85.136
296	...	...	...	p	A	75.8	75.5	4.68	8.0	10.0	86.149
297	β 578	7 21 47	—17 37	n	A	45.9	47.2	....	...		86.149
298	...	...	...	p	A	48.6	47.4	2.04	8.5	10.5	86.149
299	...	...	...	p	A	52.1	51.1	2.62	7.0	11.0	86.179
300	...	...	...	n	A	48.1	49.4	...	...		86.179
301	Σ 1104	7 23 55	—14 44	n	A	325.8	324.8	2.31	...		86.133
302	...	...	...	p	A	322.1	323.5	...	6.5	8.0	86.133
303	△ 52=H. 269	7 29 15	—23 13	n	A	110.6	109.7	8.96	...		85.082
304	...	...	...	p	A	109.5	109.6	...	...		85.082
305	H. A. H. 7	7 28 56	—23 27	n	A	203.1	203.8	1.84	...		85.082
306	...	...	...	p	A	205.9	203.8	1.74	8.0	9.0	85.082
307	Σ 1120	7 30 33	—14 14	n	A	36.3	36.6	19.59	...		84.089
308	...	...	...	p	A	36.5	36.0	...	6.0	9.5	84.089

292. Very blurry.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800-+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
309	Σ 1121	7 31 05	—14 14	p	I	303.1	304.2	...	...		82.092
310	...	...	...	n	I	305.7	304.0	...	7.0	8.0	82.092
311	...	...	...	n	I	306.6	304.5	...	...		82.092
312	...	...	...	p	I	301.5	304.0	...	7.0	7.0	82.092
313	...	...	...	n	A	305.7	304.9	7.50	...		85.121
314	...	...	...	p	A	304.6	305.1	...	7.5	8.0	85.121
315	...	...	...	n	A	305.8	305.0	...	...		85.136
316	...	...	...	p	A	305.6	306.1	7.19	7.0	7.2	85.136
317	β 201	7 33 41	—20 00	n	A	331.6	330.9	3.43	8.5	8.8	82.111
318	...	...	...	n	I	332.5	330.4	...	7.0	8.0	82.168
319	...	...	...	n	A	331.6	330.9	3.00	8.0	8.2	85.144
320	△ 53=H. 273	7 33 55	—26 32	n	I	318.2	316.2	...	...		82.092
321	...	...	...	p	I	316.0	317.9	...	4.5	4.8	82.092
322	...	...	...	p	I	317.8	319.1	...	4.0	4.3	82.092
323	...	...	...	n	I	319.9	318.8	...	...		82.092
324	...	...	...	n	A	318.5	318.0	10.00	...		82.138
325	...	...	...	p	A	318.5	319.1	10.26	4.5	5.0	82.138
326	H. C. W.	7 35	—20 00	p	A	307.1	308.1	2.5	9.0	11.0	82.111
327	...	...	...	n	A	312.9	312.1	...	...		86.179
328	...	...	...	p	A	313.1	313.8	4.74	9.0	11.5	86.179
329	Σ 1138	7 39 58	—14 24	n	A	340.2	340.0	16.53	...		85.136
330	...	...	...	p	A	339.4	340.1	...	6.0	7.0	85.136
331	Σ 1146	7 42 20	—11 54	n	I	18.5	19.5	3.03	7.0	8.5	83.993
332	...	...	...	n	III	11.9	12.2	3.49	...		85.059
333	...	...	...	p	III	11.2	13.9	...	...		85.059
334	β 902	7 52 22	—10 34	p	A	249.4	248.7	1.68	8.0	10.5	82.125
335	β 202	7 56 59	—26 53	n	A	164.7	164.4	5.	7.5	10.0	83.108
336	β 333 A. B.	7 57 23	—21 56	p	A	48.0	46.4	1.	8.0	11.0	85.144

311 and 312. O. S. observer.——313-316. Def. poor.——317. Blurred.——318. O. S. observer; very blurry.——320 and 321. O. S. observer.——326. Position approximate.——331. Def. very poor; both stars red.——332 and 333. Too blurry.——335. Too faint.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
337	β 333 A. B.	7 57 23	—21 56	p	A	44.4	43.0	...	...		86.179
338	... A. B.	...	...	n	A	41.2	42.5	1.70	7.5	9.0	86.179
339	... A. C.	...	...	p	A	73.4	73.4	42.24	8.0	8.0	85.144
340	... A. C.	...	...	p	A	73.6	73.6	42.06	7.5	7.5	86.179
341	β 203	7 57 40	—27 14	p	A	245.5	245.1	7.15	...		83.108
342	...	...	...	n	A	244.2	245.2	...	7.0	9.0	83.108
343	O. S. 68	8 04 40	—26 47	p	A	261.9	261.7	3.34	8.0	9.5	85.082
344	β 905	8 10 59	—15 57	n	A	11.2	11.5	...	8.0	10.5	82.111
345	...	...	...	n	A	13.9	14.2	3.69	8.0	10.0	84.089
346	...	...	...	p	III	17.0	14.6	...	8.5	11.0	84.155
347	...	...	...	n	A	12.8	13.1	3.81	8.5	10.0	85.160
348	β 906	8 11 23	—15 52	n	A	191.8	192.0	2.	9.0	10.5	84.089
349	...	...	...	n	III	185.9	186.3	3.27	8.5	12.0	84.155
350	H. A. H. 9	8 12 26	—26 54	p	A	117.0	117.6	3.23	8.0	8.5	86.174
351	h 4072	8 13 10	—19 35	n	A	172.8	172.7	13.92	8.5	12.0	82.125
352	β 205	8 27 54	—24 12	p	A	269.7	269.7	0.83	7.0	7.5	86.174
353	...	...	...	p	A	90.5	270.5	0.78	8.0	8.0	86.179
354	β 208	8 33 54	—22 16	p	A	45.5	43.7	1.27	...		86.179
355	...	...	...	n	A	39.0	40.6	...	6.0	8.0	86.179
356	Σ 1260	8 34 59	—11 45	n	A	302.9	301.8	...	...		83.108
357	...	...	...	p	A	302.7	303.2	5.47	7.5	7.5	83.108
358	...	...	...	n	III	303.8	303.2	...	...		84.155
359	H. C. W.	8 40	— 6 20	p	A	133.1	133.6	13.02	8.0	10.0	82.111
360	h 4143	8 45 27	—22 46	p	A	131.8	131.0	3.11	...		84.089
361	...	...	...	n	A	131.6	132.8	...	9.0	9.3	84.089
362	Schj. 12	8 46 04	—10 41	n	A	353.0	352.8	2.21	8.0	8.5	86.174
363	...	...	...	p	A	355.5	353.3	...	...		86.174
364	...	...	...	p	A	350.2	352.4	..	...		86.174

348 and 349. Too faint for good measures.——359. Observed for β 407.——363. Head inclined to right.——364. Head inclined to left.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800-+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
365	β 103	8 49 02	— 7 22	p	A	67.8	67.3	...	8.5	10.0	84.098
366	...	...	...	p	A	72.6	72.2	2.77	8.5	11.5	86.179
367	Σ 1295	8 49 37	— 7 31	n	A	0.0	0.0	4.22	7.0	7.3	86.179
368	...	...	...	p	A	1.1	359.4	...		..	86.179
369	...	...	...	p	A	359.6	1.3	...		...	86.179
370	β 210	8 51 18	—16 58	n	A	2.0	182.0	2.75	7.5	7.5	82.114
371	...	...	...	n	A	181.2	181.2	2.40	7.5	8.0	82.114
372	...	...	...	p	A	183.0	180.8	2.76	7.0	7.2	83.138
373	Σ 1308	8 58 59	— 3 31	p	A	83.6	83.5	10.99	8.5	9.0	82.229
374	...	...	...	p	I	84.6	84.6	...	8.0	9.0	85.094
375	...	...	...	p	A	84.6	84.6	10.81		...	85.094
376	h 4183	9 04 51	—29 53	n	A	157.3	157.2	17.71	6.0	10.0	83.138
377	...	...	...	p	A	156.5	157.1	...		...	83.138
378	Σ 1329	9 09 37	— 0 44	p	A	248.6	248.5	22.12	8.0	8.2	82.152
379	β 212	9 10 12	— 7 51	p	A	226.6	225.0	1.50		...	85.231
380	...	...	...	n	A	224.8	226.3	1.44	8.0	8.5	85.231
381	h 4193	9 10 55	—22 38	p	A	117.6	118.2	3.22	8.0	9.0	82.115
382	...	...	...	p	A	118.6	119.3	2.99		...	86.168
383	...	...	...	n	A	121.9	120.4	...		...	86.168
384	H. C. W.	9 14 52	—22 59	p	A	41.4	39.6	1.	7.5	10.0	82.141
385	...	...	...	n	A	37.1	38.6	1.19		...	86.174
386	...	...	...	p	A	40.9	38.9	...	8.0	9.5	86.174
387	...	...	...	p	A	36.8	35.0	...		...	86.179
388	...	...	...	n	A	33.0	34.4	1.56	8.0	10.0	86.179
389	H C. 123	9 18	—23 08	n	A	0.0	0.0	5.	7.5	12.0	83.171
390	H. C. W.	9 20	—23 10	n	I	30.3	30.8	24.20		...	83.184
391	...	...	...	p	I	30.4	29.1	...	8.0	12.0	83.184
392	...	...	...	n	A	28.2	28.4	25.13		...	83.184

368. Head inclined to right.——369. Head inclined to left.——371. O. S. observer.——384. Obs. for h 4193.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
393	H. C. W.	9 20	—23 10	p	A	29.3	28.7	...	...		83.184
394	Σ 1357	9 22 29	— 9 28	p	A	53.2	52.7	7.77	7.0	10.0	82.229
395	β 339	9 25 17	—15 13	p	A	221.6	220.0	1.57	...		85.231
396	...	...	...	n	A	219.2	220.5	1.44	8.5	9.5	85.231
397	β 910	9 27 10	—13 28	p	A	304.1	304.6	7.01	7.0	9.5	82.152
398	...	...	...	n	A	305.8	304.9	6.92	...		82.152
399	O. S.	9 35	—16 38	p	A	265.5	266.0	2.82	8.0	9.5	82.125
400	...	...	...	n	A	268.1	266.0	3.25	8.0	9.5	82.125
401	...	...	...	p	I	266.0	265.7	3.20	6.5	9.0	83.226
402	...	...	...	p	A	265.1	265.0	2.90	8.5	10.0	85.226
403	H. A. H. 11	9 34 45	—32 22	n	A	16.1	16.4	5.07	8.0	11.0	85.186
404	...	...	...	n	A	16.0	16.3	5.18	8.0	11.0	86.168
405	A. C. 5	9 46 34	— 7 32	p	A	131.1	138.4	0.5	6.0	6.5	86.174
406	(*δ Sextantis*)	...	...	n	A	309.5	300.5	0.3	...		86.179
407	...	...	...	p	A	304.9	312.2	...	...		86.179
408	H. A. H.	9 46 54	—28 06	n	A	195.1	195.2	9.32	...		85.121
409	...	...	...	p	A	196.9	195.9	...	8.5	10.0	85.121
410	β 215	9 48 41	—27 26	n	A	348.2	347.8	2.03	7.5	9.5	82.248
411	...	...	...	n	A	343.2	342.6	1.73	7.5	9.5	86.179
412	β 592	9 49 16	—15 38	n	A	190.8	190.9	10.	6.0	13.0	83.168
413	...	...	...	p	A	190.6	191.6	...	...		83.168
414	Arg. S. 29	9 51 31	—27 58	p	A	301.8	302.1	35.37	...		83.184
415	...	...	...	n	A	302.8	302.3	...	8.0	8.5	83.184
416	Anon.	9 51	—28 06	p	A	83.5	83.5	57.53	7.0	9.5	83.163
417	Cord. Z. C. ix. 4322	9 56 27	—28 06	p	A	32.6	32.1	...	...		86.168
418	...	...	...	n	A	32.2	32.5	21.49	8.0	8.0	86.168
419	H. C. W.	10 01	—28 00	n	A	216.0	217.2	1.44	7.8	8.0	82.248
420	...	...	. .	n	A	37.1	218.6	0.82	...		85.226

395 and 396. Difficult; def. poor.— 399. O. S. observer.——405. Elongated, but not separated.——406 and 407. Very doubtful.——416. Obs. for W. M. C. Z. (92) 12.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
421	H. C. W.	10 01	—28 00	p	A	37.8	215.6	1.18	7.5	7.5	85.226
422	β 217	10 01 16	—24 08	p	A	276.2	276.2	1.94	7.8	8.2	82.125
423	...	...	...	p	I	274.6	274.8	...	7.0	7.5	82.166
424	...	...	...	n	I	277.5	273.0	...		...	82.166
425	...	...	...	p	A	274.6	274.7	...	8.0	8.3	82.229
426	...	...	...	n	A	276.4	274.4	2.13	8.0	8.0	82.240
427	H. A. H. 12	10 05 25	− 36 00	n	A	132.6	131.6	4.03		...	85.177
428	...	...	...	p	A	132.6	133.4	3.85	9.0	9.5	85.177
429	Σ 1416	10 06 29	—15 30	n	A	276.5	277.5	12.24	7.5	9.0	82.231
430	...	...	...	p	A	277.0	277.0	12.13	8.0	9.5	82.245
431	...	...	...	p	I	278.2	278.2	12.06		...	83.226
432	...	...	...	n	I	277.8	275.6	...		...	83.226
433	...	...	...	p	A	277.5	277.5	11.85	7.0	9.0	83.226
434	H. A. H. 13	10 09 26	—36 03	n	A	308.6	307.4	3.12		...	85.177
435	...	...	...	p	A	304.9	305.8	3.60	8.5	9.5	85.177
436	h 4305	10 14 55	—23 02	p	A	216.1	215.6	17.71	7.7	9.5	82.111
437	...	...	...	n	A	214.3	214.6	17.72	7.5	10.0	82.229
438	...	...	...	p	A	216.6	216.1	17.92	7.5	9.0	82.231
439	β 912	10 16 26	—13 04	p	A	99.9	100.4	...	9.0	12.0	83.163
440	...	...	...	p	A	99.4	99.8	...		...	83.168
441	Σ 1440	10 23 46	— 3 18	n	A	346.7	346.6	15.52	7.7	9.0	82.245
442	...	...	...	n	A	347.4	347.3	15.38		...	83.226
443	...	...	...	p	A	347.1	347.9	15.67	7.0	9.0	83.226
444	h 4337?	10 31 45	—18 44	p	A	72.9	72.7	10.04	8.0	10.0	82.152
445	...	...	...	p	A	70.0	69.8	...	9.0	10.0	82.231
446	...	...	...	p	A	71.2	71.0	10.25	9.0	11.0	83.163
447	...	...	...	p	A	73.6	73.4	9.90	9.0	10.0	85.177
448	...	...	...	n	A	72.4	73.3	...		...	85.177

422. O. S. observer.——423 and 424. Cloudy.——425. Blurry.——434 and 435. Def. poor.——446. Def. good, but stars faint in smoke.

Number..	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800.+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
449	Σ 1470	10 40 09	— 5 08	n	A	10.5	10.9	1.37	...		84.226
450	Σ 1474	10 41 43	—14 38	n	I	197.1	197.6	6.94	7.5	8.0	82.100
451	...	...	...	n	I	196.7	196.7	6.61	7.5	7.8	82.100
452	...	...	...	n	A	195.6	195.6	...	...		82.100
453	...	...	...	n	I	197.1	197.6	7.07	7.0	7.0	82.166
454	...	...	...	p	I	198.2	195.8	7.20	...		82.166
455	...	...	...	n	I	198.8	199.3	7.29	6.5	7.0	83.256
456	...	...	...	p	I	200.5	198.1	...	...		83.256
457	...	...	...	n	A	196.6	196.8	6.68	7.0	7.3	85.122
458	...	...	...	p	A	197.7	196.6	...	...		85.122
459	...	...	...	n	A	196.6	196.8	6.34	7.5	7.7	85.324
460	...	...	...	p	A	197.2	196.1	...	...		85.324
461	β 595	10 41 48	—14 20	n	A	8.0	8.4	1.8	8.5	10.0	82.240
462	...	...	...	n	A	11.1	11.4	2.11	8.0	11.0	85.226
463	...	...	...	n	A	13.8	14.2	1.95	8.0	11.0	86.179
464	...	...	...	n	A	17.8	18.2	...	8.0	10.0	86.308
465	Σ 1476	10 43 12	— 3 23	n	A	1.2	1.2	1.93	7.0	8.0	86.308
466	β 111	10 45 11	— 8 28	n	A	1.6	1.6	3.70	9.0	9.2	82.111
467	...	...	...	p	A	7.7	5.7	3.87	9.0	9.5	82.240
468	...	...	...	n	A	5.2	5.3	3.37	...		86.168
469	...	...	...	p	A	9.0	6.9	...	...		86.168
470	...	...	...	p	A	3.4	5.5	...	...		86.168
471	H. C. W.	10 49	—34 50	n	A	168.3	168.2	33.96	8.0	9.5	85.231
472	...	...	...	p	A	169.8	169.2	...	...		85.231
473	O. S.	10 49 30	—26 26	n	A	203.7	204.3	2.3	9.3	9.5	82.229
474	...	...	...	n	A	208.2	208.8	3.81	9.0	9.5	85.186
475	...	...	...	n	A	206.2	206.7	3.81	9.0	9.5	86.179
476	Σ 1500	10 53 55	— 2 50	n	A	316.1	314.5	1.38	...		86.300

451 and 452. O. S. observer.——461. Def. poor.——464. Stars faint in haze; def. good.——469. Head turned to right.——470. Head turned to left.——471. Measured for H. A. H. 14.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
477	Σ 1500	10 53 55	— 2 50	p	A	316.8	318.4	1.44	7.5	8.0	86.300
478	H. i. 77	10 56 12	—15 08	n	A	15.0	15.3	3.22	8.5	8.7	82.111
479	...	...	...	n	I	15.9	16.8	3.28	8.0	8.2	82.198
480	...	...	...	p	I	18.3	14.7	3.18		...	82.198
481	...	...	...	n	A	17.0	17.3	2.83	8.8	9.0	85.177
482	H. A. H. 15	10 57 30	—26 52	n	A	335.8	335.2	2.39	8.0	9.5	85.324
483	h 4412	11 04 11	—28 57	p	A	267.0	267.0	12.69	7.5	8.5	82.152
484	...	...	...	p	A	265.9	266.2	12.48	7.5	8.8	82.152
485	Arg. S. 33	11 07 36	—15 19	n	A	170.9	350.8	17.87	9.0	9.0	82.166
486	...	...	...	p	A	351.4	350.6	18.58	9.0	9.3	82.229
487	...	...	...	n	A	351.4	351.3	17.31	9.0	9.2	86.300
488	β 916	11 08 13	—14 47	n	A	6.8	7.0	0.5		...	83.256
489	...	...	...	n	A	357.5	357.4	0.8	8.0	9.5	86.308
490	Σ 1530	11 13 39	— 6 15	n	A	313.2	312.6	...		...	83.163
491	...	...	...	p	A	313.7	314.3	7.73	7.5	8.0	83.163
492	O. S.	11 15 27	—19 48	n	A	308.0	307.1	...		...	85.177
493	...	...	...	p	A	309.1	309.7	...	8.0	12.0	85.177
494	...	...	...	n	A	306.6	305.7	...		..	85.185
495	...	...	...	p	A	306.9	307.5	5.70	8.0	10.5	85.185
496	H. C. W.	11 18	— 9 50	n	A	178.0	178.0	11.15	9.5	10.0	82.240
497	...	...	...	n	A	177.2	177.2	11.40	9.5	10.0	82.283
498	...	...	...	n	A	181.5	181.5	...	10.0	11.5	85.324
499	Arg. S. 35	11 17 51	—27 51	n	I	335.2	334.3	22.01		...	82.198
500	...	...	...	p	I	334.4	334.8	22.04	8.0	9.0	82.198
501	...	...	...	p	A	119.5	299.7	21.96		...	83.226
502	...	...	...	n	A	118.9	298.5	22.35	9.0	9.0	83.226
503	β 601 B. C.	11 23 15	—16 40	p	A	221.2	219.2	1.09		...	86.308
504	...	...	...	n	A	219.0	220.6	0.99	8.5	9.0	86.308

484. O. S. observer.——488. Distance estimated.——489. Distance estimated; sky hazy.——494. Def. poor.——496. Observed for β 26.——499 and 500. Perhaps an error of 30° in reading position circle?

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
505	H.iv.112 A. B. C.	11 23 15	—16 40	n	A	331.0	330.8	27.69	8.0		86.308
506	Jacob 143	11 23 41	—23 47	p	A	75.8	76.1	8.22	5.5	8.5	82.248
507	...	...	...	p	A	79.1	79.0	8.41	6.0	8.5	83.256
508	...	...	...	n	A	79.5	78.3	...		...	83.256
509	...	...	...	p	A	81.8	81.6	8.92	7.5	9.0	84.220
510	...	...	...	p	I	80.2	80.0	...		...	84.319
511	...	...	...	n	I	79.9	77.3	...		...	84.319
512	...	...	...	p	A	79.7	79.6	8.20		...	84.319
513	...	...	...	n	A	80.2	79.0	...	6.0	8.0	84.319
514	...	...	...	p	A	80.2	80.1	8.01		...	84.355
515	...	...	..	p	A	80.0	79.9	8.55	7.0	9.0	85.177
516	Σ 3072	11 24 44	— 6 03	n	A	331.6	331.2	...	7.0	9.5	82.166
517	...	...	...	n	A	331.6	331.2	9.62	7.7	9.5	82.283
518	...	...	...	p	A	329.2	330.1	9.81	7.0	9.5	82.302
519	Σ 1548	11 25 59	— 2 52	n	A	128.3	127.8	10.34		...	82.152
520	...	...	...	p	A	124.9	125.5	10.44	7.0	8.5	82.152
521	...	...	...	n	A	128.8	128.1	10.63		...	85.231
522	...	...	...	p	A	127.7	128.1	10.53	8.5	9.0	85.231
523	H. A. H. 16	11 33 34	—36 46	p	A	102.2	102.5	3.32	9.0	9.2	85.324
524	h 4479	11 47 16	—23 55	p	A	90.5	90.5	7.14	8.5	9.0	82.229
525	...	...	...	n	A	91.6	90.2	7.24	8.0	9.0	82.240
526	h 4481	11 51 12	—21 52	n	A	196.4	196.8	3.41		...	82.313
527	...	...	...	p	A	197.0	195.7	3.54	7.5	7.7	82.313
528	..	...	...	n	A	195.3	195.7	3.81		...	84.220
529	...	...	...	p	A	198.6	196.9	...	8.5	8.5	84.220
530	...	...	...	p	A	198.2	196.5	...		...	85.177
531	...	...	...	n	A	196.8	197.2	3.20	8.0	8.2	85.177
532	...	...	...	n	A	196.2	196.7	3.23		...	85.251

506. O. S. observer.——519 and 520. O. S. observer.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
533	h 4481	11 51 12	—21 52	p	A	197.1	195.4	3.29	8.0	8.3	85.251
534	...	...	...	n	P	197.1	197.5	3.13	...		85.251
535	β 457	11 55 16	—20 52	p	A	77.7	77.2	0.5	8.5	9.0	82.283
536	...	...	...	p	A	85.9	85.7	1.05	8.5	9.5	84.319
537	Σ 1593	11 57 23	— 1 47	p	A	21.7	19.3	1.46	8.5	8.7	84.356
538	β 458	11 58 08	—20 22	p	A	233.7	233.5	30.50	...		83.226
539	...	...	...	n	A	232.8	233.2	30.57	7.0	9.0	83.226
540	h 4496	12 00 01	—18 14	n	A	28.1	28.4	12.69	8.7	9.0	82.111
541	...	...	...	p	A	29.1	28.4	12.99	9.0	9.5	82.111
542	Σ 1604 A. B.	12 03 15	—11 11	p	A	90.8	90.8	11.45	7.0	9.5	84.319
543	...	...	...	p	A	91.4	91.4	11.30	...		84.356
544	...	...	...	p	A	91.9	91.9	11.46	6.0	9.0	85.186
545	... A. C.	...	...	p	A	92.2	92.2	42.25	7.0	8.5	84.319
546	...	...	...	p	A	92.1	92.1	42.23	...		84.356
547	...	...	...	p	A	92.5	92.5	41.52	6.0	6.5	85.186
548	H. A. H. 18	12 03 51	—34 02	n	A	20.5	21.0	3.09	...		85.177
549	...	...	...	p	A	22.9	21.3	...	8.0	9.0	85.177
550	...	...	...	n	A	20.7	21.2	3.42	...		85.324
551	...	...	...	p	A	21.4	19.8	...	6.5	9.0	85.324
552	h 4505	12 05 30	—29 57	p	A	270.7	270.7	12.	8.0	11.0	82.283
553	h 4506	12 05 32	—23 19	n	A	355.2	355.2	3.5	8.0	10.0	82.286
554	H. C. W.	12 06	—22 50	n	A	38.6	39.0	11.17	9.5	9.7	82.283
555	...	...	...	p	A	38.3	37.7	...	9.5	10.0	82.286
556	Σ 1627	12 12 00	— 3 17	n	A	195.7	195.9	20.51	...		82.313
557	...	...	...	p	A	196.5	195.8	20.45	$\triangle$m = 0.2		82.313
558	...	...	...	p	A	197.0	196.3	20.16	...		85.313
559	...	...	...	n	A	196.1	196.8	20.02	$\triangle$m = 0.1		85.313
560	β 605	12 13 58	—21 30	p	A	131.2	133.0	0.5	8.0	9.0	84.319

535. Distance estimated; def. poor.——545. Is not *A* elongated, P. A. 50°± ?——553 and 555. Sky hazy.——560. Too blurry.

Number ..	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.	Epoch 1800+
		H. M. S.	° ′			°	°	″		
561	Σ 1635	12 14 57	—10 48	n	A	173.6	173.5	13.03	7.5 8.0	82.229
562	...	...	...	p	A	173.5	174.5	13.79	7.5 9.0	82.313
563	h 4517	12 17 09	—19 36	n	A	185.3	185.3	14.61	8.5 9.0	82.240
564	...	...	...	p	A	186.3	185.4	15.89	8.5 9.5	82.313
565	H. iv. 105	12 23 40	—15 51	p	A	215.8	215.3	23.75	...	84.356
566	(δ *Corvi*)	...	...	n	A	213.9	214.2	23.52	5.0 8.5	84.356
567	Σ 1649	12 25 24	—10 24	n	A	195.1	195.2	15.32	7.0 7.5	82.229
568	...	...	...	n	A	194.0	194.1	15.68	7.0 7.3	82.240
569	...	...	...	p	A	195.2	194.5	15.74	...	82.283
570	...	...	...	n	P	194.8	194.8	15.32	...	85.231
571	...	...	...	p	P	194.5	193.8	...	7.0 7.5	85.231
572	...	...	...	n	A	...	...	14.82	...	85.231
573	Σ 1664	12 32 07	—10 49	p	A	248.0	247.8	21.29	...	85.313
574	...	...	...	n	A	247.7	248.3	...	...	85.313
575	...	...	...	p	A	248.6	248.4	21.61	7.5 8.5	86.300
576	Σ 1670	12 35 35	— 0 48	n	A	154.9	155.1	...	△m = 0.1	82.152
577	(γ *Virginis*)	...	...	n	A	335.8	335.4	5.34	...	82.283
578	...	...	...	p	A	334.0	335.1	5.74	...	82.283
579	...	...	...	n	I	335.4	334.5	5.31	...	82.283
580	...	...	...	n	A	333.9	333.5	6.07	...	84.220
581	...	...	...	n	I	335.8	335.1	...	...	84.352
582	...	...	...	p	I	334.3	336.6	...	...	84.352
583	...	...	...	n	A	335.9	335.5	5.43	...	84.352
584	...	...	...	p	A	334.2	335.3	5.46	△m = 0.2	84.352
585	...	...	...	n	A	333.6	333.2	5.34	...	85.324
586	...	...	...	p	A	333.1	334.2	5.37	△m = 0.0	85.324
587	...	...	...	n	A	336.9	336.4	5.39	...	86.303
588	...	...	...	p	A	335.4	336.5	5.37	4.0 4.1	86.303

568. Def. poor.——569. Clouds.——576. O. S. observer; very large images.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
589	O. Σ 256	12 50 17	— 0 18	p	A	247.4	246.5	0.82	...		86.303
590	...	...	...	n	A	246.0	248.6	...	8.0	8.5	86.303
591	O. S 73	12 52	—12 29	p	A	67.3	66.6	1.93	8.5	9.0	85.313
592	A. G. C. 5	12 54 25	— 2 43	n	A	156.2	155.3	1.37	...		84.352
593	...	...	...	p	A	153.5	155.9	...	7.0	9.0	84.352
594	β 341	12 57 19	—19 56	p	A	314.5	316.3	0.96	...		84.352
595	...	...	...	n	A	319.8	317.9	...	8.0	8.0	84.352
596	H. A. H. 22	13 06 24	—28 58	p	A	295.3	296.1	2.90	...		85.324
597	...	...	...	n	A	298.8	297.4	2.71	8.0	9.5	85.324
598	H. ii. 45	13 07 03	—18 11	n	I	34.9	36.1	5.29	...		82.294
599	(*54 Virginis*)	...	...	p	I	35.6	33.9	5.31	7.0	7.0	82.294
600	...	...	...	n	A	34.3	34.9	5.68	...		82.294
601	...	...	...	p	A	35.8	35.0	5.64	6.7	7.0	82.294
602	...	...	...	p	A	35.8	34.9	5.65	...		82.313
603	...	...	...	n	A	33.3	33.9	5.68	7.0	7.0	82.313
604	...	...	...	p	I	36.3	34.6	5.62	...		82.313
605	...	...	...	n	I	33.6	34.9	5.46	...		82.313
606	...	...	...	p	A	34.5	33.7	5.27	...		85.231
607	...	...	...	n	A	33.3	33.9	4.99	7.0	7.2	85.231
608	β 342	13 08 49	—18 17	p	I	38.0	35.6	4.36	...		82.335
609	...	...	...	n	I	34.0	35.5	4.38	7.5	8.5	82.335
610	...	...	...	p	A	37.1	35.0	4.24	...		82.335
611	...	...	...	n	A	34.0	34.7	4.19	8.0	8.5	82.335
612	O. S. 74	13 09	—23 35	n	A	335.0	334.7	12.42	...		85.231
613	...	...	...	p	A	334.1	334.8	...	7.0	10.0	85.231
614	W. U.	13 12 35	—25 55	n	A	200.9	201.1	17.22	9.0	9.0	85.324
615	H. C. W.?	13 13	—25 55	n	I	190.3	190.5	10.15	8.0	9.0	84.330
616	...	...	...	p	I	193.2	191.5	10.08	...		84.330

592. Small star distinct, but large one blurred.——594. Disks touching.——615. Observed for W. U.; perhaps error of 2 rev. = 6.″80 in distance.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
617	β 114	13 28 00	— 8 00	n	A	138.9	137.8	1.48	...		84.352
618	...	...	...	p	A	137.7	139.4	1.58	9.0	9.0	84.352
619	...	...	...	n	A	321.2	319.8	1.53	...		86.303
620	...	...	...	p	A	318.9	320.6	1.43	8.5	9.0	86.303
621	△ 138	13 30 09	—25 53	n	A	191.4	191.4	9.98	7.0	8.0	84.356
622	...	...	...	p	A	190.8	191.8	...	...		84.356
623	...	...	...	n	A	191.3	191.4	10.03	...		84.376
624	...	...	...	p	A	193.7	192.7	...	...		84.376
625	β 611	13 31 15	—14 07	p	A	260.3	260.1	2.5	8.7	10.0	82.313
626	...	...	...	p	III	266.1	266.0	2.5	8.5	11.5	86.349
627	Σ 1763	13 31 18	— 7 16	p	A	45.1	44.0	2.99	...		84.356
628	...	...	...	n	A	41.2	42.3	2.93	8.0	8.3	84.356
629	H. C. W.	13 32	—30 10	..	...	80.	...	2.	8.0	8.3	83.335
630	h 4605	13 34 28	—29 18	p	A	288.4	288.6	18.21	8.0	9.7	82.313
631	Σ 3081	13 38 47	—11 15	p	A	70.2	69.6	2.12	9.0	9.5	86.303
632	β 413	13 42 15	—27 46	p	A	108.6	108.7	77.77	7.0	8.0	85.324
633	h 4617	13 43 54	—29 17	p	A	261.0	260.8	5.09	8.0	9.5	83.360
634	Σ 1788	13 48 41	— 7 28	p	A	72.9	72.5	3.02	...		82.335
635	...	...	...	n	A	72.2	73.8	3.35	6.0	8.0	82.335
636	...	...	...	p	A	71.1	70.7	2.81	6.0	6.5	82.398
637	...	...	...	p	A	71.7	71.3	2.63	...		84.352
638	...	...	...	n	A	70.4	72.0	2.94	7.5	8.0	84.352
639	...	...	...	p	A	73.4	73.0	2.59	...		84.376
640	...	...	...	p	A	74.1	73.7	2.75	7.0	7.5	86.303
641	...	...	..	p	A	73.8	73.4	2.46	6.5	7.0	86.349
642	h 2692 A. C.	13 51 14	—16 45	p	A	223.5	223.1	24.59	9.0	9.0	82.398
643	...	...	...	p	A	224.0	223.6	29.81	...		86.385
644	...	...	...	n	A	222.2	222.6	...	8.5	10.0	86.385

617. A fine pair; both blue.——625 and 626. Too faint for distance.——629. Estimates. — 632. *A* is purple; *B* blue.——634. Def. very poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
645	h 2692 A. B.	13 51 14	—16 45	n	A	325.4	324.6	3.34	9.0	10.0	82.398
646	...	...	...	n	A	323.2	322.3	...	...		86.385
647	...	...	...	p	A	319.5	320.8	2.92	8.5	9.5	86.385
648	H. A. H. 78	13 57	—12 29	n	A	8.1	8.2	13.09	8.5	9.0	86.349
649	h 4650 A. B.	14 00 05	—28 37	p	A	59.1	58.5	5.	9.0	9.5	84.316
650	... A. C.	...	...	p	A	34.4	34.0	25.		11.0	84.316
651	... A. D.	...	...	p	A	319.3	319.6	40.		11.0	84.316
652	h 4661	14 05 08	—28 20	p	A	234.1	233.4	4.40	9.0	9.3	83.360
653	...	...	...	n	A	230.5	231.6	...	...		83.360
654	h 4664	14 07 33	—28 41	n	A	16.4	16.6	18.01	9.0	9.1	84.318
655	h 1249	14 10 25	—15 53	n	A	169.1	168.9	5.23	8.5	10.0	82.294
656	...	...	...	n	A	167.6	167.3	4.66	8.5	10.5	86.349
657	H. A. H. 27	14 10 39	—27 16	p	A	75.7	75.5	5.92	8.5	9.0	85.324
658	β 116	14 13 03	—13 09	p	A	277.1	277.5	3.12	8.0	8.5	85.283
659	...	...	...	n	A	280.4	278.6	...	...		85.283
660	h 2711	14 15 51	—22 32	p	A	132.5	133.0	...	8.5	11.0	83.360
661	...	...	...	p	A	129.4	129.9	14.94	...		85.283
662	...	...	...	n	A	132.3	131.7	13.20	9.0	12.0	85.283
663	Σ 1833	14 16 18	— 7 13	n	I	348.4	348.0	5.60	7.0	7.0	82.409
664	...	...	...	p	I	346.6	348.8	5.86	...		82.409
665	...	...	...	n	A	348.1	347.9	5.59	...		82.409
666	...	...	...	p	A	347.5	348.6	5.47	7.0	7.0	82.409
667	Σ 1837	14 18 14	—11 07	p	A	305.0	306.2	1.66	7.5	9.0	82.223
668	...	...	...	n	A	311.0	309.2	1.65	7.0	8.5	85.324
669	...	...	...	p	A	308.6	309.8	1.48	...		85.324
670	...	...	...	n	A	311.2	309.5	1.36	...		86.385
671	...	...	...	p	A	308.5	309.9	1.33	7.5	8.5	86.385
672	Σ 1846	14 22 02	— 1 41	p	A	108.4	108.8	4.56	6.0	9.0	84.352

649–651. Distances estimated.——660. Too faint.——661. Very difficult.——667. Def. very poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
673	Σ 1846	14 22 02	— 1 41	n	A	110.1	108.7	4.49	...		84.352
674	Σ 1847	14 22 14	— 9 40	p	A	259.9	259.8	23.58	8.0	9.0	86.349
675	Σ 1852 rej.	14 23 45	— 3 43	p	A	267.9	267.9	24.48	7.5	10.0	86.385
676	β 117	14 24 41	—15 05	p	A	93.7	93.7	2.58	7.5	8.5	86.349
677	h 2723	14 25 24	—23 30	p	A	138.2	138.6	28.10	8.0	9.5	82.398
678	β 226	14 32 05	—21 49	p	A	83.8	83.5	0.96	8.0	8.2	84.316
679	...	...	...	n	A	84.0	87.2	...	...		84.316
680	...	...	...	p	A	85.6	85.3	1.06	9.0	9.2	84.415
681	Σ 1869	14 36 22	— 5 27	n	I	131.0	131.8	26.06	...		82.335
682	...	...	...	p	I	132.2	131.5	25.88	8.0	8.5	82.335
683	...	...	...	p	A	131.6	131.9	26.05	...		82.335
684	...	...	...	n	A	131.9	131.5	26.00	...		82.335
685	H. iii. 97	14 39 04	—24 56	n	A	129.8	129.1	...	...		84.396
686	(*54 Hydræ*)	...	...	p	A	128.8	129.3	9.03	6.0	7.5	84.396
687	Σ 1876	14 40 02	— 6 53	p	A	72.6	72.0	1.33	8.0	8.5	85.283
688	β 106	14 42 45	—13 39	n	A	337.8	337.0	1.56	5.0	7.0	85.283
689	h 4716	14 49 22	—24 10	n	A	353.7	353.6	3.46	8.7	9.7	82.294
690	...	...	...	n	A	359.4	359.4	...	...		82.398
691	...	...	...	p	A	357.9	359.9	3.09	9.0	9.5	82.398
692	Sh. 190	14 50 27	—20 52	n	A	293.0	292.2	...	...		85.324
693	(*P. xiv. 212*)	...	...	p	A	291.5	291.8	15.61	6.0	8.0	85.324
694	...	...	...	p	A	292.2	292.4	15.71	...		86.349
695	...	...	...	n	A	294.4	293.7	...	6.0	7.5	86.349
696	... A. F.	...	...	n	III	323.1	323.0	...	...		86.385
697	...	...	...	p	III	322.6	322.8	138.07	6.0	11.0	86.385
698	β 239	14 51 33	—27 10	n	A	317.8	316.1	...	...		84.396
699	...	...	...	p	A	309.8	311.5	1.20	7.0	7.5	84.396
700	h 4722	14 52 15	—30 14	n	A	340.9	340.6	8.13	7.0	9.0	85.324

678 and 679. Splendid pair; Def. excellent.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.	Epoch 1800+
		H. M. S.	° ′			°	°	″		
701	β 348	14 55 40	+ 0 20	p	A	113.0	117.3	0.2	7.0 8.0	84.396
702	...	...	...	n	A	125.5	114.9	0.6	...	84.415
703	...	...	...	p	A	121.0	125.5	...	...	84.415
704	h 4727	14 56 26	—27 22	n	A	216.5	217.0	7.96	7.0 7.2	82.398
705	h 4740	15 03 10	—28 00	n	A	357.9	357.9	0.2	8.5 9.0	84.316
706	H. vi. 44 A. B.	15 05 23	—19 20	p	A	110.0	110.0	57.68	4.0	84.316
707	(*ι Libræ*)	...	...	p	III	110.5	110.6	57.87	5.0	86.349
708	β 618 B. C.	...	...	n	A	19.5	20.2	1.40	11.0 12.0	84.316
709	...	...	...	n	III	18.8	19.4	...	10.0 10.5	86.349
710	H. A. H. 31	15 05 23	—36 48	p	A	49.1	48.5	6.52	...	85.324
711	...	...	...	n	A	48.2	49.0	6.37	8.0 8.0	85.324
712	H. C. W.	15 07	— 4 10	p	A	288.5	288.8	5.26	8.5 10.0	84.396
713	β 350	15 08 29	—27 09	n	A	161.8	161.1	1.38	...	82.409
714	...	...	...	p	A	156.8	159.1	1.45	7.0 8.0	82.409
715	...	...	...	n	A	161.3	160.6	1.18	6.0 8.5	85.283
716	β 228	15 12 38	—23 50	n	A	329.4	328.3	1.20	...	84.415
717	...	...	...	p	A	328.4	330.6	1.08	9.0 9.3	84.415
718	H. A. H. 32	15 13 46	—37 47	p	A	121.6	122.2	5.79	...	85.324
719	...	...	...	n	A	121.2	120.2	...	7.5 9.5	85.324
720	H. A. H. 34	15 23 45	—33 24	n	A	161.1	160.4	1.60	8.0 9.5	85.283
721	H. A. H. 36	15 34 20	—14 26	p	A	271.0	271.0	5.43	8.5 9.5	85.324
722	H. A. H. 38	15 37 38	—20 36	n	A	197.7	198.2	2.68	8.0 9.5	82.398
723	...	...	...	n	A	204.2	204.7	...	8.5 10.0	84.396
724	h 4807	15 40 31	—20 52	n	A	359.4	359.4	12.	7.0 12.0	82.374
725	β 36	15 46 24	—24 58	p	A	270.3	270.3	3.06	...	82.409
726	(*ε Scorpii*)	...	...	n	A	271.9	269.8	2.84	5.0 7.0	82.408
727	...	...	...	p	A	279.4	279.6	2.69	6.0 8.0	85.324
728	...	...	...	p	III	278.8	279.0	2.98	6.0 8.0	86.442

701. Too blurry; stars notched, but not separated.——702. Def. poor; distance estimated.——705. Notched; not clearly separated.——712. Found while looking for Σ 3091.——724. Too faint for distance.——725. Quite blurry; perhaps error of 10° in P. A.?

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
729	Sh. 213	15 52 09	—19 35	n	A	319.0	318.6	17.46	...		84.415
730	...	...	...	p	A	318.7	319.2	17.18	9.0	9.2	84.415
731	...	...	...	n	III	319.8	319.4	17.36	...		86.349
732	...	...	...	p	III	319.4	319.9	17.24	8.0	8.5	86.349
733	...	...	...	n	A	320.1	319.7	17.10	...		86.407
734	...	...	...	p	A	319.0	319.5	17.00	8.5	8.8	86.407
735	Σ 1998 A. B.	15 57 46	—11 02	n	A	14.7	15.2	1.31	7.0	7.2	84.352
736	(ξ *Scorpii*)	...	...	p	A	17.3	14.7	1.47	...		84.352
737	...	...	...	n	A	16.8	17.3	...	...		84.415
738	...	...	...	p	A	18.6	16.0	1.26	6.0	6.5	84.415
739	...	...	...	n	A	16.9	17.4	1.19	5.0	5.5	86.349
740	... A. C.	...	...	p	A	61.7	61.3	7.89		8.0	84.352
741	...	...	...	n	A	59.7	60.6	...	...		84.352
742	...	...	...	p	A	61.2	60.8	7.95		8.5	84.415
743	...	...	...	p	A	61.2	60.8	7.68		7.0	86.349
744	... B. C.	...	...	p	A	69.8	69.5	6.73	...		86.349
745	H. iii. 7	15 58 28	—19 29	p	I	23.3	24.0	13.89	4.0	6.0	82.480
746	(β *Scorpii*)	...	...	n	I	26.3	24.8	13.88	...		82.480
747	β 39	16 00 57	—12 25	p	A	253.9	253.5	3.14	4.0	9.0	82.374
748	(*11 Scorpii*)	...	...	n	A	257.2	255.5	...	...		82.374
749	...	...	...	p	A	255.3	254.9	3.58	4.5	9.0	82.379
750	β 120 A. B.	16 05 01	—19 09	n	A	3.4	3.4	0.5	7.0	7.5	84.396
751	(ν Scorpii) C. D.	...	...	n	A	43.5	44.7	...	...		84.396
752	...	...	...	p	A	48.7	47.5	2.12	8.0	9.0	84.396
753	...	...	...	p	A	49.5	48.5	2.24	...		86.349
754	...	...	...	n	A	43.3	44.7	...	7.5	8.5	86.349
755	H. iv. 124	16 13 29	—19 52	n	A	22.2	22.5	12.70	8.5	9.5	86.407
756	H. iv. 121	16 13 54	—25 18	p	A	272.0	272.0	20.37	...		82.398

745. May 24, 1884; *A* triple? 90° 0.″5 6.0 8.0; 270° 0.″3 9.5.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
757	(σ′ *Scorpii*)	16 13 54	—25 18	n	A	272.0	271.2	20.42	3.0	8.0	82.398
758	h 4850	16 17 08	—29 25	n	A	351.6	351.5	6.98	...		82.409
759	...	...	...	p	A	351.7	352.9	7.09	6.5	7.0	82.409
760	...	...	...	n	I	352.6	352.3	6.78	...		82.409
761	...	...	...	p	I	349.0	351.6	6.78	...		82.409
762	H. ii. 19	16 18 23	—23 10	n	A	358.0	358.0	3.55	...		82.475
763	(ρ *Scorpii*)	...	...	p	A	354.4	356.2	3.60	6.0	7.5	82.475
764	...	...	...	n	I	356.5	356.4	3.82	...		82.480
765	...	...	...	p	I	353.6	357.4	4.07	6.0	6.5	82.480
766	...	...	...	n	I	357.0	356.9	3.25	...		84.492
767	O. S.	16 19 49	—26 55	n	A	345.2	345.0	...	7.5	12.0	82.374
768	...	...	...	p	A	339.9	340.8	9.18	7.0	12.0	82.379
769	Antares	16 22 03	—26 10	p	A	274.3	274.4	3.40	1.0	6.0	82.409
770	...	...	...	n	A	271.7	273.7	3.25	...		82.409
771	...	...	...	p	A	275.9	276.0	...	...		84.316
772	Σ 3105	16 25 21	— 6 46	p	A	42.6	40.4	0.75	...		86.407
773	...	...	...	n	A	40.5	42.2	0.72	8.0	8.5	86.407
774	O. Σ 315	16 43 8	+ 1 28	n	A	165.0	164.4	1.16	...		84.409
775	...	...	...	p	A	163.3	166.1	...	7.0	8.0	84.409
776	β 123	16 47 29	—21 51	n	A	24.3	25.1	1.56	8.5	8.5	86.407
777	β 241	16 48 24	—21 22	n	A	345.0	344.2	0.5	...		84.385
778	Σ 3106	16 49 17	— 4 59	p	A	62.9	63.5	2.52	...		82.379
779	...	...	...	n	A	64.9	63.1	2.45	8.0	8.2	82.379
780	Sh. 240	16 50 00	—19 21	p	I	232.4	230.8	4.95	...		82.489
781	...	...	...	n	I	231.4	233.6	5.08	7.0	8.5	82.489
782	...	...	...	p	I	232.1	230.6	4.81	...		84.407
783	...	...	...	n	I	229.8	232.0	4.67	6.5	8.0	84.407
784	...	...	...	p	A	231.3	230.6	4.77	...		84.459

766. Blurry.——774. Blurred: difficult.——777. Not clearly separated. Is there a faint comparison in P. A. 200°, 1″?

Number..	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
785	Sh. 240	16 50 00	—19 21	n	A	230.9	231.9	4.89	8.0	9.0	84.459
786	H. A. H. 44	16 57 29	—33 36	p	A	244.5	244.1	5.82	8.5	9.0	84.385
787	H. A. H. 45	16 58 48	—35 44	n	A	23.9	24.3	5.43	9.0	9.0	84.385
788	Σ 2119	16 59 42	—13 46	n	A	14.2	14.4	1.95	8.0	8.3	84.459
789	h 4922	17 01 27	—20 04	n	I	310.2	309.3	21.27	7.0	10.0	82.480
790	...	...	...	p	I	309.3	310.0	21.91	...		82.480
791	h 589	17 03 29	—24 47	p	I	300.6	301.4	10.12	...		84.407
792	...	...	...	n	I	302.0	300.5	10.16	9.0	9.2	84.407
793	...	...	...	p	A	300.2	300.6	9.68	...		84.407
794	Σ 2132	17 06 26	— 3 54	p	A	107.8	108.5	1.72	8.0	9.0	82.475
795	...	...	...	n	A	116.8	114.6	1.82	...		82.475
796	...	...	...	p	I	110.4	111.9	...	...		82.475
797	...	...	...	n	I	116.6	111.8	...	...		82.475
798	Sh. 243	17 07 59	—26 25	n	A	20.3	20.7	4.30	6.0	6.2	84.385
799	(*36 Ophiuchi*)	...	...	p	A	19.7	18.3	...	...		84.385
800	...	...	...	p	A	201.0	199.6	4.43	...		84.574
801	...	...	...	n	A	199.5	199.9	4.52	△m = 0.1		84.574
802	h 4932 A. C.	17 08 43	—18 03	n	A	226.2	226.8	10.	9.0	11.0	84.459
803	H. C.W. A. B.	...	...	p	A	292.3	293.1	1.31	9.0	9.1	84.459
804	β 126	17 12 54	—17 38	p	A	262.2	262.0	1.90	7.0	8.0	84.407
805	...	...	...	p	A	261.2	261.0	1.98	7.0	8.5	84.409
806	Arg. 66	17 22 42	—17 43	p	A	195.3	194.3	8.57	...		84.490
807	...	...	...	n	A	194.4	194.6	8.39	8.5	9.0	84.490
808	Σ 2173 A. C.	17 24 14	— 0 58	p	A	290.7	291.0	7.	4.0	10.0	83.502
809	Σ 2191	17 33 25	— 4 54	p	I	267.7	267.7	26.47	7.0	8.0	82.470
810	...	...	...	p	A	268.3	268.3	26.39	...		82.470
811	Σ 2204	17 39 35	—13 16	n	A	205.1	205.4	14.80	...		82.489
812	...	...	...	p	A	205.5	204.9	14.72	8.0.	8.2	82.489

800. Blurry. — 804. Def. very poor.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
813	Σ 2262	17 56 33	— 8 11	p	A	252.6	252.3	2.28	...		82.475
814	(*τ Ophiuchi*)	...	...	n	A	249.0	250.9	2.39	6.0	6.5	82.475
815	...	...	...	p	A	252.9	252.6	2.09	...		82.494
816	...	...	...	n	A	250.5	252.4	2.09	4.0	6.0	82.494
817	...	...	...	p	A	254.9	254.6	2.37	4.0	5.0	83.502
818	...	...	...	p	A	251.8	251.5	...	...		83.565
819	...	...	...	p	A	253.8	253.5	1.94	...		84.409
820	Σ 2272	17 59 23	+ 2 32	p	A	54.8	53.8	2.84	4.0	7.0	82.494
821	(*70 p Ophiuchi*)	...	...	n	A	49.8	51.0	3.01	...		82.494
822	...	...	...	p	A	38.8	37.4	2.42	...		84.409
823	...	...	...	n	A	36.4	37.4	2.17	6.5	8.0	84.409
824	H. C. W.	18 09	—25 03	p	A	52.4	52.2	27.99	7.5	9.0	82.470
825	H. C. W.	18 11	—17 00	p	A	261.3	261.2	9.10	8.8	9.0	83.502
826	*β* 135	18 31 16	—14 06	n	A	187.1	187.3	2.49	7.0	11.0	82.470
827	h 5084	18 58 18	—37 14	n	A	45.0	45.5	...	...		81.719
828	(*γ Coronæ Austr.*)	...	...	p	A	46.1	46.8	1.41	...		81.721
829	...	...	...	n	A	43.8	44.3	1.43	...		81.721
830	...	...	...	p	A	39.0	37.3	...	...		83.565
831	...	...	...	n	A	37.4	38.7	...	...		83.565
832	...	...	...	n	A	35.2	36.5	1.66	...		83.675
833	...	...	...	p	A	40.2	38.5	...	...		83.675
834	H. A. H. 93	19 08 09	—16 11	n	A	162.2	161.9	5.04	8.5	8.5	85.571
835	h 589	19 10 47	—16 11	n	A	13.8	14.0	8.30	7.0	7.5	82.604
836	...	...	...	n	A	15.2	15.4	8.11	6.0	7.0	85.571
837	h 1381	19 11 13	—16 10	p	A	17.2	16.0	5.00	...		82.470
838	...	...	...	n	A	16.4	16.7	4.87	8.0	8.0	82.470
839	*β* 142	19 21 30	—12 23	n	A	324.5	323.4	1.72	...		82.470
840	...	...	...	p	A	320.7	322.3	1.77	8.0	8.5	82.470

817 and 818. Very blurry.——820. Def. very poor.——827–829. O. S. observer.——830–833. Stars blurred.——836. Stars blue.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
841	β 142	19 21 30	—12 23	p	A	326.2	325.0	1.56	...		82.615
842	...	...	...	n	A	325.1	326.7	1.67	7.5	7.5	82.615
843	Σ 2541	19 30 12	—10 42	n	A	331.8	331.3	3.75	...		82.634
844	...	...	...	p	A	330.3	331.5	3.83	7.5	9.5	82.634
845	...	...	...	n	A	332.0	331.4	3.84	8.5	9.0	85.571
846	S. 722	19 32 18	—17 11	p	I	57.5	56.6	10.20	...		85.653
847	...	...	...	n	I	56.3	57.8	...	7.0	7.0	85.653
848	...	...	...	n	A	55.2	55.9	9.72	...		85.708
849	...	...	...	p	A	57.0	56.6	...	7.0	7.2	85.708
850	O. S. 101	19 40	—22 07	n	A	8.9	9.2	1.56	8.0	9.0	85.571
851	h 2904	19 47 07	—24 14	n	A	135.9	135.5	17.24	6.5	9.5	82.615
852	...	...	...	p	A	135.0	135.5	17.38	...		82.615
853	...	...	...	n	I	136.7	135.8	...	...		82.620
854	...	...	...	p	I	135.6	136.5	17.16	7.0	9.5	82.620
855	...	...	...	n	III	134.2	133.6	...	...		85.631
856	...	...	...	p	III	131.7	132.3	16.29	6.0	11.0	85.631
857	H. C. W.	19 48	—24 10	p	A	117.3	117.6	17.34	8.0	10.5	85.708
858	A. C. 12	19 52 08	— 2 33	n	A	328.8	327.6	1.21	...		82.612
859	...	...	...	p	A	326.9	329.0	1.27	7.0	7.5	82.612
860	h 2918	19 54 58	—17 53	p	A	135.7	136.2	16.90	8.5	9.0	82.639
861	H. C. W.	20 01 45	—23 02	p	A	314.5	315.0	20.97	7.5	8.0	83.675
862	Σ 2636	20 05 20	— 4 57	p	A	204.0	203.2	12.47	...		82.634
863	...	...	...	n	A	203.5	203.8	12.57	8.0	9.0	82.634
864	O. S. 102	20 09 19	—32 58	n	A	306.2	304.7	...	...		85.571
865	...	...	...	p	A	303.5	304.4	2.43	8.0	8.5	85.571
866	H. C. W.	20 11	—12 55	p	A	96.4	96.4	8.31	9.0	9.5	82.615
867	...	...	...	n	A	96.2	96.2	8.34	9.0	9.5	82.620
868	H. A. H. 103	20 12 51	—29 30	n	A	6.5	6.6	4.71	9.0	9.2	85.708

857. A little north foll. h 2904 in finder.——866. Near α capricorni.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
869	H. A. H.	20 20	—27 10	n	A	52.7	53.9	3.08	...		85.708
870	...	...	...	p	A	55.4	54.4	...	8.5	9.0	85.708
871	H. C. W.	20 20	—27 10	n	A	21.8	22.1	6.91	...		82.612
872	...	...	...	p	A	22.0	21.0	7.12	8.0	9.3	82.612
873	o Capricorni	20 23 01	—18 59	p	I	239.2	238.7	22.30	...		82.669
874	...	...	...	n	I	239.9	241.0	22.57	6.0	6.5	82.669
875	...	...	...	p	A	239.7	239.5	...	...		82.669
876	...	...	...	n	A	239.9	240.4	...	...		82.669
877	...	...	...	p	I	240.6	240.1	21.73	5.5	6.0	85.571
878	...	...	...	n	I	239.2	240.3	22.07	...		85.571
879	...	...	...	p	III	239.8	239.5	21.79	7.5	8.0	85.630
880	...	...	...	n	III	239.3	239.8	...	...		85.630
881	h 2975	20 26 30	—22 38	n	A	22.7	23.0	10.	7.0	10.0	82.639
882	O. S.	20 31	—26 55	n	A	242.8	244.7	1.76	9.0	9.3	82.620
883	...	...	...	p	A	247.0	246.2	1.80	9.0	9.3	82.639
884	β 267	20 35 25	— 4 50	p	A	63.0	62.2	2.	9.5	10.0	85.705
885	h 921	20 35 21	— 4 56	p	A	221.8	221.1	9.36	...		82.634
886	...	...	...	n	A	221.2	221.7	9.41	8.0	8.2	82.634
887	β 153	20 40 10	—26 51	p	A	285.2	285.7	1.55	8.0	9.0	82.612
888	...	...	...	n	A	284.1	286.3	1.75	7.5	9.0	82.639
889	O. S. 105	20 40 40	—28 11	n	A	177.0	177.0	17.27	7.5	10.5	85.705
890	H. n 10?	20 41	—18 38	p	A	294.5	294.8	15.83	...		82.478
891	...	...	...	n	A	295.3	294.6	15.89	7.0	7.5	82.478
892	H. C. W.	20 46	—23 50	n	A	19.1	19.2	31.06	8.5	8.8	83.675
893	Σ 2745	20 57 44	— 6 18	n	I	188.0	188.5	2.85	6.5	9.0	82.631
894	...	...	...	..	...	194.2	190.2	...	...		82.631
895	...	...	...	..	...	191.0	191.2	2.91	6.0	8.5	83.697
896	...	...	...	..	...	189.1	189.3	2.68	7.0	8.5	85.571

871. Found while looking for H. A. H.——895. Colors: Yellowish green; blue.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
897	Σ 2745	20 57 44	— 6 18	n	A	190.6	190.9	2.76	6.0	8.0	85.624
898	...	...	...	p	A	192.2	190.2	...	...		85.624
899	β 368	21 01 01	— 8 43	p	A	89.4	89.4	0.5	7.0	7.5	82.669
900	H. C. W.	21 05 35	—23 11	n	A	36.0	36.4	9.55	9.0	9.5	83.675
901	...	...	...	p	I	37.9	36.4	9.32	...		85.628
902	...	...	...	n	I	35.8	36.6	9.04	9.5	10.5	85.628
903	...	...	...	n	A	34.0	34.3	9.86	...		85.705
904	...	...	...	p	A	39.7	39.0	9.35	9.0	9.5	85.705
905	h 5251	21 04 38	—23 36	p	A	305.1	305.6	8.50	8.5	9.0	85.624
906	h 5252	21 05 43	—15 19	n	III	321.7	323.5	2.84	...		85.735
907	...	...	...	p	III	321.6	320.1	2.94	8.0	8.1	85.735
908	Σ 2781	21 10	— 8 09	n	A	170.2	170.3	2.98	7.8	8.5	81.700
909	...	...	...	n	A	350.2	350.0	3.09	8.0	8.0	82.634
910	...	...	...	p	A	169.8	170.6	3.28	8.0	8.2	82.639
911	...	...	...	n	A	351.3	351.1	2.93	8.0	8.2	85.708
912	O. S.	21 10 42	—27 44	n	A	236.1	236.9	...	...		85.628
913	...	...	..	p	A	241.2	240.7	7.38	8.5	9.5	85.628
914	...	...	...	p	A	238.7	238.2	6.97	...		85.715
915	...	...	...	n	A	237.3	238.1	...	8.5	9.5	85.715
916	β 252	21 12 58	—27 49	p	A	95.6	95.7	2.52	8.0	8.2	85.628
917	...	...	...	p	A	96.9	97.0	2.36	8.0	8.0	85.716
918	H. A. H.	21 18 33	—20 54	n	A	145.4	144.7	8.35	7.5	9.0	82.612
919	...	...	...	p	A	142.9	143.7	8.95	8.5	10.0	82.620
920	...	...	...	n	A	144.6	144.1	8.57	8.0	10.0	82.669
921	...	...	...	p	A	143.8	144.6	...	...		82.669
922	...	...	...	n	A	145.3	144.8	8.52	...		85.708
923	...	...	...	p	A	144.3	145.1	...	8.0	10.5	85.708
924	β 683	21 20 43	—20 44	n	I	192.9	193.1	1.	7.0	10.0	82.710

924. Too faint for higher powers.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
925	H. A. H. 108	21 37 04	—27 04	n	A	303.2	301.3	...	...		85.716
926	...	...	...	p	A	303.9	305.0	1.50	8.0	9.5	85.716
927	Σ 2826 A. C.	21 40 57	—13 42	p	A	82.4	82.2	4.31	8.0	8.0	82.617
928	...	...	...	p	I	80.6	80.1	4.46	...		82.631
929	...	...	...	p	A	84.0	83.8	4.33	8.0	8.5	82.631
930	... A. B.	...	...	p	A	96.8	96.9	0.92	8.0	9.5	82.617
931	O. S. 110	21 41 25	—27 42	n	A	186.0	186.1	3.	8.5	9.5	85.708
932	β 168	21 47 07	—20 35	p	A	73.9	73.7	5.93	8.0	9.5	82.478
933	Σ 2839 rej.	21 48	—12 40	p	A	275.1	275.1	31.01	8.0	9.5	82.710
934	Σ 2847	21 51 53	— 4 04	n	A	307.0	305.0	...	...		82.634
935	...	...	...	p	A	302.7	304.0	...	7.0	7.5	82.634
936	...	...	...	n	A	312.0	310.0	...	...		82.639
937	...	...	...	p	A	302.1	303.4	1.24	7.0	7.5	82.639
938	...	...	...	n	A	309.3	307.3	...	..		83.696
939	...	...	...	p	A	302.8	304.1	1.36	8.0	8.5	83.696
940	Σ 2848	21 52 06	— 4 52	p	A	56.7	56.3	11.06	7.0	7.0	82.634
941	...	...	...	n	A	55.5	56.1	...	...		82.634
942	...	...	...	n	I	57.2	56.3	10.60	...		82.634
943	...	...	...	p	I	55.2	56.5	...	...		82.634
944	O. S.	21 52 42	—28 12	p	A	39.1	38.5	11.10	...		85.735
945	...	...	...	n	A	37.0	37.5	...	7.5	10.0	85.735
946	H. C. W.	21 53	—23 00	p	A	45.6	45.2	21.25	8.0	8.5	83.675
947	β 276	21 53 56	—29 02	n	A	120.2	118.3	...	4.0	6.0	82.669
948	...	...	...	p	A	115.8	116.8	1.72	...		82.669
949	...	...	...	p	A	114.6	115.6	1.61	5.5	7.5	85.705
950	...	...	...	n	A	116.4	114.4	...	...		85.705
951	...	...	...	p	A	115.7	116.7	1.60	...		85.732
952	...	...	...	n	A	117.2	115.3	1.65	6.0	7.0	85.732

931. Def. very poor; reject!

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
953	H. C. W.	21 54	+ 1 20	n	A	209.2	210.4	1.17	...		82.760
954	...	...	...	p	A	216.1	213.8	1.24	8.0	9.0	82.760
955	H. A. H. 112	21 55 00	—16 11	p	A	272.1	272.1	8.96	7.0	10.0	82.612
956	...	...	...	n	A	272.4	271.3	...	7.0	12.0	82.639
957	...	...	...	p	A	91.7	271.7	9.08	8.0	10.5	85.624
958	...	...	...	p	A	271.1	271.1	8.60	7.5	10.0	85.716
959	S. 802	21 55 53	—17 33	p	A	243.7	243.2	3.94	...		82.631
960	...	...	...	n	A	243.2	244.5	4.17	7.0	8.5	82.631
961	...	...	...	p	A	245.0	244.4	3.89	...		85.708
962	...	...	...	n	A	242.0	243.2	...	6.5	6.6	85.708
963	H. C. W.	22 00	—23 40	n	A	331.4	331.1	10.	9.0	11.0	85.624
964	H. A. H. 113	22 01 51	—28 38	n	A	155.0	154.3	2.68	8.0	9.5	85.705
965	...	...	...	n	A	153.6	152.9	2.52	...		85.732
966	...	...	...	p	A	150.7	152.3	2.35	8.0	9.0	85.732
967	β 170	22 02 31	—19 04	p	A	65.4	64.5	1.39	8.0	9.0	85.735
968	β 475	22 06	— 8 35	p	A	238.2	237.1	1.79	8.0	9.5	82.612
969	...	...	...	n	A	235.8	237.5	1.87	7.0	9.0	82.639
970	Sh. 339	22 07 40	—21 40	p	A	117.5	118.0	5.42	...		82.669
971	(*41 Aquarii*)	...	...	n	A	119.1	117.9	5.46	5.5	7.0	82.669
972	...	...	...	p	A	117.7	118.2	5.27	6.0	7.0	83.675
973	...	...	...	n	A	117.2	116.0	5.03	6.0	7.5	85.708
974	...	...	...	p	A	116.8	117.3	...	...		85.708
975	H. C. W.	22 13	—24 15	n	A	356.8	356.8	10.54	8.5	9.5	85.716
976	Sh. 345	22 20 03	—17 21	p	A	306.4	306.8	7.81	...		82.631
977	(*53 Aquarii*)	...	...	n	A	306.6	306.1	8.07	6.0	6.2	82.631
978	...	...	...	p	A	306.5	306.9	8.02	...		82.669
979	...	...	...	n	A	306.6	305.9	8.17	$\triangle$m = 0.2		82.669
980	...	...	...	p	A	306.7	307.1	7.90	...		82.730

973. Stars pink and blue.—976. Very blurry.—978. Blurry.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.	Epoch 1800+
		H. M. S.	° ′			°	°	″		
981	Sh. 345	22 20 03	—17 21	n	A	306.8	306.1	7.79	4.0 6.0	82.730
982	...	...	...	n	A	306.5	306.9	...	...	83.696
983	...	...	...	p	A	306.8	306.1	7.87	6.0 7.0	83.696
984	...	...	...	n	A	307.1	307.5	7.38	...	85.732
985	...	...	...	p	A	307.5	306.8	7.42	6.0 6.5	85.732
986	Σ 2909	22 22 39	— 0 38	n	A	332.0	331.4	3.74	△m = 0.2	82.612
987	(ζ *Aquarii*)	...	...	n	I	331.7	330.2	...	...	82.628
988	...	...	...	p	I	329.9	332.7	...	...	82.628
989	...	...	...	n	A	332.7	332.0	3.43	...	82.628
990	...	...	...	p	A	329.8	331.1	3.41	5.0 5.5	82.628
991	...	...	...	n	A	331.2	330.5	3.85	...	83.696
992	...	...	...	p	A	329.9	331.2	3.52	5.0 6.0	83.696
993	...	...	...	n	A	328.4	327.7	3.30	...	85.715
994	...	...	...	p	A	327.9	329.1	3.23	△m = 0.8	85.715
995	...	...	...	n	A	328.6	327.9	2.99	...	85.820
996	...	...	...	p	A	326.9	328.2	3.14	5.0 5.3	85.820
997	β 77	22 27 52	— 2 24	p	A	213.4	212.0	2.65	...	85.820
998	...	...	...	n	A	214.0	214.7	...	8.0 9.5	85.820
999	Σ 2928	22 33 10	—13 14	n	A	319.1	318.3	...	...	82.631
1000	...	...	...	p	A	317.0	318.0	4.49	7.0 7.3	82.631
1001	...	...	...	n	A	316.6	315.8	4.38	...	82.639
1002	...	...	...	p	A	316.6	317.6	4.26	8.0 8.0	82.639
1003	...	...	...	n	A	317.9	317.1	4.31	...	82.730
1004	...	...	...	p	A	317.2	318.2	4.41	8.0 8.5	82.730
1005	...	...	...	n	A	319.3	318.5	...	...	83.696
1006	...	...	...	p	A	317.8	318.8	4.74	8.0 8.2	83.696
1007	...	...	...	n	A	137.6	316.8	4.37	...	85.732
1008	...	...	...	p	A	136.9	317.9	4.11	8.0 8.0	85.732

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece	Position Angle.		Distance..	Magnitudes.		Epoch 1800+
						Obs.	Corr.				
		H. M. S.	° ′			°	°	″			
1009	O. S. 116	22 36 09	—32 16	p	A	35.8	34.2	2.91	...		85.716
1010	...	...	...	n	A	33.6	34.4	3.06	8.0	9.0	85.716
1011	Σ 2944 A. B.	22 41 39	— 4 51	p	A	255.9	255.6	3.60	7.0	7.2	85.708
1012	...	...	...	p	A	256.5	256.2	3.20	8.0	8.5	85.715
1013	... (A. B.) C.	...	...	n	A	134.9	134.7	...		7.5	85.708
1014	... A. C.	...	...	n	A	136.0	135.7	47.26		8.5	85.715
1015	h 5367	22 45 51	—33 31	p	II	270.7	270.7	...	...		84.869
1016	...	...	...	p	A	272.5	272.5	4.08	6.0	8.5	84.869
1017	...	...	...	p	A	272.8	272.8	4.05	6.0	9.0	85.773
1018	...	...	...	p	A	273.5	273.5	4.01	5.5	8.5	85.820
1019	H. A. H. 117	22 49 18	—33 11	p	A	238.3	237.6	4.69	...		85.716
1020	...	...	...	n	A	237.0	238.0	4.86	6.0	10.0	85.716
1021	...	...	...	p	A	236.0	235.3	...	5.5	11.0	85.820
1022	H. A. H. 118	22 59 16	— 4 54	n	A	211.7	212.3	4.22	8.0	10.0	85.708
1023	Σ 2988	23 05 43	—12 35	p	A	281.2	281.4	3.67	7.0	7.2	82.639
1024	...	...	...	n	A	282.3	280.7	4.00	...		82.639
1025	...	...	...	p	I	281.6	281.9	3.65	...		82.639
1026	...	...	...	n	I	284.3	280.6	3.93	...		82.639
1027	...	...	...	n	I	284.1	280.4	3.87	7.0	7.5	82.730
1028	...	...	...	p	I	282.4	282.8	...	...		82.730
1029	...	...	...	p	A	101.0	281.1	3.86	△m = 0.0		84.818
1030	...	...	...	n	A	102.0	280.3	...	...		84.818
1031	...	...	...	p	A	280.7	280.9	3.47	7.0	7.1	85.732
1032	...	...	...	n	A	281.7	280.0	...	...		85.732
1033	H. A. H. 119	23 07 50	—32 58	p	A	267.3	267.3	6.72	8.0	10.5	85.716
1034	...	...	...	p	A	267.4	267.4	...	7.5	11.0	85.773
1035	...	...	...	p	A	267.4	267.4	7.07	7.0	10.5	85.820
1036	Σ 2993 A. B.	23 07 47	— 9 35	n	A	356.5	176.5	25.58	...		82.669

1021. Too faint for distance.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800+
		H. M. S.	° ′			°	°	″			
1037	Σ 2993 A. B.	23 07 47	— 9 35	n	I	357.5	177.5	25.69	6.5	6.5	82.669
1038	...	...	...	n	I	177.1	177.1	25.13	7.0	7.5	85.812
1039	...	...	...	n	III	176.8	176.8	25.45	7.0	7.5	85.815
1040	... A. C.	...	...	p	I	112.7	112.7	131.75		7.5	85.812
1041	...	...	...	n	I	113.2	113.1	...		...	85.812
1042	...	...	...	p	III	113.4	113.4	131.67		7.5	85.815
1043	... B. C.	...	...	p	I	103.0	103.0	123.00		...	85.812
1044	...	...	...	p	III	102.3	102.3	122.40		...	85.815
1045	β 181	23 07 31	—14 03	n	A	312.5	311.3	...	7.0	9.5	82.669
1046	...	...	...	n	A	323.6	322.4	1.64		...	84.869
1047	...	...	...	p	A	318.6	320.4	1.54	7.0	9.0	84.869
1048	...	...	...	n	A	316.0	314.7	1.46	7.5	9.0	85.732
1049	...	...	...	n	A	311.7	310.5	1.29		...	85.735
1050	...	...	...	p	A	311.0	312.8	1.28	7.5	9.0	85.735
1051	...	...	...	n	A	312.5	311.0	1.58		...	85.861
1052	...	...	...	p	A	312.1	313.5	1.50	7.0	9.0	85.861
1053	Σ 3008	23 17 32	— 9 07	p	A	254.9	254.5	4.84		...	82.628
1054	...	...	...	n	A	253.2	254.4	5.11	7.0	7.3	82.628
1055	...	...	...	p	A	251.7	251.3	4.93	7.5	8.5	84.815
1056	...	...	...	p	A	252.3	251.9	4.60		...	84.818
1057	...	...	...	n	A	251.7	253.0	5.01	8.0	9.0	84.818
1058	...	...	...	p	A	252.6	252.3	4.62		...	85.708
1059	...	...	...	n	A	250.8	252.1	...	6.5	7.5	85.708
1060	H. C. 176?	23 20	—22 04	n	A	52.2	53.1	5.38	8.0	8.5	82.612
1061	...	...	...	p	A	53.4	52.7	5.24	9.0	9.5	82.705
1062	O. S. 121	23 21 23	—27 20	n	A	216.8	218.1	...	9.5	10.0	84.869
1063	...	...	...	p	A	220.5	218.8	1.47		...	84.869
1064	...	...	...	p	A	222.4	220.7	1.43	8.0	8.5	85.716

1042 and 1044. Measures of double distance.——1046. Both stars red.——1050. White; purple.

Number...	Double Star.	Mean R. A. 1880.	Mean Decl. 1880.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance..	Magnitudes.		Epoch 1800.+
		H. M. S.	° ′			°	°	″			
1065	h 3196	23 23 37	—21 14	n	A	19.1	19.3	20.52	7.5	9.5	82.628
1066	...	...	...	p	I	20.5	19.1	20.46		...	82.634
1067	...	...	...	p	A	18.3	17.6	21.46	8.0	11.0	82.705
1068	H. A. H. 122	23 30 44	—32 32	p	A	253.2	252.9	4.95	7.0	10.0	85.773
1069	...	...	...	p	III	254.0	253.5	5.17	6.0	8.5	85.815
1070	...	...	...	n	III	251.1	253.0	...		...	85.815
1071	...	...	...	p	A	253.2	252.9	5.37		...	85.815
1072	H. ii. 24	23 39 47	—19 21	n	A	139.1	138.4	6.02	6.0	7.0	82.787
1073	...	...	...	p	A	136.8	137.5	6.25		...	82.787
1074	...	...	...	n	A	139.0	138.3	6.17	6.0	7.0	84.818
1075	...	...	...	p	A	139.1	139.8	...		...	84.818
1076	...	...	...	n	A	138.3	137.6	5.78	6.0	7.0	85.716
1077	...	...	...	p	A	138.1	138.8	5.81		...	85.716
1078	H. C. W.	23 47	—22 07	n	A	193.1	193.1	46.43	8.0	9.0	84.815
1079	...	...	...	p	A	193.6	193.2	...		...	84.815
1080	...	...	...	p	A	192.8	192.4	...		...	85.820
1081	...	...	...	n	A	192.8	192.8	45.63	7.5	9.0	85.820
1082	Σ 3046	23 50 14	—10 10	p	A	246.7	246.4	3.19	8.0	8.5	82.702
1083	...	...	...	n	A	243.2	246.0	3.36		...	82.702
1084	...	...	...	p	A	246.2	245.9	3.22	8.5	9.0	84.869
1085	...	...	...	p	A	247.6	247.3	2.94	7.5	8.0	85.716
1086	...	...	...	p	A	247.1	246.8	2.98		...	85.812
1087	...	...	...	n	A	244.0	246.8	...	7.5	8.0	85.812
1088	h 5440	23 56	—27 48	n	A	287.6	286.0	3.43		...	85.773
1089	...	...	...	p	A	287.5	287.8	3.50	8.0	8.5	85.773
1090	...	...	...	n	A	287.8	286.2	...		...	85.815
1091	...	...	...	p	A	288.3	288.7	3.62	8.0	8.5	85.815

1067. Too faint.

NOTES AND PREVIOUS MEASURES.

1. Σ 3063. A slow binary. The angle is diminishing at the rate of about 0.°24 per year. The following are all the measures:

	°	″		
1831.50	232.9	1.79	3n	Σ
45.86	227.3	...	1	Mä.
64.84	223.7	1.85	3	De.
65.55	224.4	1.84	3	De.
77.86	221.4	1.80	3	C_4
77.88	223.3	1.86	2	β
78.05	222.3	1.88	2	Hall
79.71	220.6	1.78	3	C_6
82.76	222.1	1.85	1	W.
85.82	219.1	1.77	2	W.

11. Σ 23. This pair has been frequently observed. The measures from 1828 to 1885 indicate a rectilinear motion of 0.″123 per year in direction 195°. The change is probably due to proper motion of the principal star.

22. O. S. Probable change. The following are all the measures:

	°	″		
1877.86	271.1	5.37	2n	C_4
85.46	277.1	5.85	3	W.

38. β 233. Possible change in angle. These are all the measures:

	°	″		
1877.80	87.3	1.30	2n	C_4
85.49	91.2	1.31	3	W.

50. Σ 86. Rectilinear motion; probably of the fainter star, as the meridian observations of the brighter star by Struve and Schjellerup agree exactly. The annual motion is 0.″060 in direction 94° or 274°.

77. Σ 113. 42 Ceti. A slow binary, of which numerous measures have been made. The angle has changed 20° since Σ.

78. h 2036=β 110. Probably a slow binary. Considerable change is shown by the following measures:

	°	″		
1830.79	53.0	2.	1n	h.
35.72	45.0	1.25	1	h.
36.96	38.1	1.82	1	h.
57.97	36.1	1.57	1	Ja.
74.65	26.5	1.54	2	De.
76.20	24.6	1.50	1	β
77.76	25.1	1.40	5	C_4
79.79	23.8	1.55	2	Hall
79.79	24.1	1.66	5	C_5
84.83	24.9	1.63	3	W.

111. Σ 231. 66 Ceti. The two stars have a common proper motion of +0.ˢ036 and —0.″04. The double star observations since 1821 indicate an increase of about 5° in the angle, and possibly an increase of less than 0.″5 in the distance.

148. h 3535. Herschel gives this note: "A strong suspicion that this star is a close double, but no time to verify it." On each occasion the star seemed to be elongated, but could not be divided.

155. β 11. Probably a binary. The following are all the measures:

1875.64	87.2	2.72	5n	De.
77.82	85.9	2.45	3	C_4
79.95	85.1	2.47	3	β
84.83	81.8	2.64	1	W.

160. h 3555. Binary. The principal star has a proper motion of +0.025 +0.″62 (Stone). The apparent motion of the companion is almost at right angles to the direction of proper motion. The measures of position angle are somewhat discordant:

	°	″		
1835.86	310.0	5.30	3n	h.
47.00	309.6	4.09	...	Ja.
56.16	310.0	3.31	...	Ja.
77.81	316.0	2.44	3	C_4
79.53	311.6	2.61	4	Hall
84.87	321.8	2.40	2	W.

164. Σ 367. Binary. Motion retrograde. The principal measures are:

	°	″		
1831.72	281.4	0.95	3n	Σ
41.70	273.9	0.91	1	O Σ
42.34	277.0	0.5	3	Mä.
57.12	266.5	0.89	1	Se.
64.01	257.1	...	6	De.
72.51	246.7	0.73	6	W. & S.
78.05	246.0	0.80	2	Hall
85.32	234.1	0.73	2	W.

168. h 3563=H h 83. Herschel gives for this star the angle 246.°5.

178. Σ 422. Probably binary. Motion direct and very slow; perhaps becoming more rapid.

186. H. A. H. 5. The only measures are:

1876.00	33.1	2.57	4n	C_3
77.60	33.3	2.44	3	C_4
84.88	36.4	2.42	1	W.

188. Σ 518. A well known ternary system. The star *D* is fixed. The measures therefore show proper motion. The following are all the measures of *A D*:

1864.84	185.0	77.85	...	H. C. O.
77.12	148.0	37.2	...	Fl.
79.52	132.9	35.78	1	C_5
81.75	121.4	35.18	1	W.

190. Σ 536. There has been a decided increase in the angle. The motion is probably becoming more rapid:

1832.20	152.3	1.78	4n	Σ
67.29	154.4	1.70	3	De.
78.91	158.4	1.63	4	$C_{4,\ 5,\ \text{and}\ 6}$
80.02	160.2	1.83	3	Hall
84.95	160.9	1.80	3	W.

209. Σ 651. The relative motion of the fainter star is 0.″222 in direction 15.°5:

1829.67	101.8	10.81	2n	Σ
30.30	101.0	10.5	...	h.
44.52	83.5	11.08	2	Mä.
45.19	82.6	11.49	1	Mä.
58.10	(88.4)	12.40	2	Mä.
65.28	64.7	14.09	5	De.
68.05	63.1	15.06	6	H. C. O.
71.17	60.6	15.08	6	De.
77.94	56.8	16.92	6	W. & S.
77.95	55.2	16.54	1	C_4
79.44	55.1	17.04	2	$C_{5\ \text{and}\ 6}$
85.06	52.6	17.82	1	W.

211. Σ 655. H. iii. 67. Herschel's position angle must be 20° too large. No change whatever is indicated by the measures since 1829:

1783.06	359.4	12.33	1n	H.
1829.54	338.1	12.42	2	Σ
32.14	338.0	13.08	2	Σ
35.06	337.0	12.91	2	Σ
67.69	336.2	12.58	4	De.
78.06	336.3	12.32	1	C_5
80.42	337.8	12.43	2	β
83.08	337.2	13.12	2	W.

217. D. 6. Possibly binary. These are all the measures:

1854.14	79.8	0.82	2n	Da.
66.90	79.4	...	3	H. C. O.
77.97	87.1	0.88	1	C_4
83.11	83.6	0.68	2	O. S. and W.

220. Σ 735. The brighter star has a proper motion of about 0.″145 in direction 166°. I could find no recent meridian observations, but obtained an equatorial comparison with the star Radcliff Observations, 1882, No. 130, on March 2, 1886. The position thus obtained and Struve's position reduced to 1886.0 are given below. They indicate a proper motion of +0.ˢ0024 and —0.″143 in R. A. and Decl. respectively, which results agree almost exactly with those obtained from the double star observations:

	a 1886.0	*δ* 1886.0	
1837.6	5 27 18.90	—6 35 09.6	Struve
1886.2	19.02	16.6	Wilson

The following are all of the double star observations:

1831.15	355.2	30.92	2n	Σ
47.23	354.2	34.01	1	Mä.
51.20	354.2	34.51	1	Mä.
66.72	353.6	36.56	...	De.
76.10	352.8	37.91	2	Hall
77.13	354.3	38.05	1	Fl.
86.17	353.5	38.73	1	W.

225. D 4. 42 Orionis. There is an 11m companion at P. A. 220°± distance 40″±. The following measures of the close pair indicate probable change:

1848.05	220.1	2.00	2n	Da.
78.12	214.7	1.61	1	C_5
81.74	213.5	1.69	1	O. S.

243. β 19. The following measures show possible change in the angle:

1876.26	165.0	3.52	3n	De.
77.12	164.5	3.66	2	C_4
80.81	166.1	3.65	3	β
85.14	169.1	3.66	1	W.

245–272. A. G. C. 1. Sirius. The mean results for the several years are:

1881.74	41.4	9.66	1n	O. S.
1882.11	41.8	9.36	1	O. S.
82.11	41.2	9.68	2	W.
83.14	41.3	...	1	W.
84.11	36.0	8.66	3	W.
85.15	31.5	7.74	3	W.
86.15	28.7	6.80	5	W.

The companion is becoming much more difficult to observe, and will soon be beyond the reach of all but the best telescopes.

279. Arg. S. 16. This is probably S. 537. If so, the angle has changed 10°:

1823.?	281.9	30.30	...	S.
82.18	270.1	...	1	O. S.

280. β 325. Needs to be reobserved. The following are the only measures:

1877.11	32.1	2.05	1n	C_4
84.09	37.0	2.06	1	W.

301. Σ 1104. A binary. Motion direct:

1831.88	292.4	2.35	3n	Σ
64.50	312.3	2.21	3	De.
68.11	312.9	2.45	9	H. C. O.
74.17	314.0	2.55	1	W. & S.
74.17	314.2	2.5	1	Gl.
78.44	318.3	2.29	8	C_5
86.13	324.2	2.31	1	W.

303. $\triangle$52. Probable change in angle. The magnitudes are about 6.0=6.0:

1826.	105.4	...	1n	$\triangle$
...	284.9	9.01	1	S.
36.8	106.8	9.37	3	h.
68.16	287.4	9.37	1	H. C. O.
76.10	108.6	9.76	6	C_3
78.60	108.1	9.05	2	C_5
85.08	109.6	8.96	1	W.

335. β 202. The following are all the measures of this star:

1877.13	159.9	7.83	1n	C_4
79.20	161.0	7.65	1	C_5
83.11	164.4	...	1	W.

352. β 205. Probably binary. Motion retrograde:

1874.2	130.±	0.5 est	1n	β
1877.11	280.9	1.00	1	C_4
78.53	100.3	0.63	3	C_5
86.18	270.1	0.80	2	W.

354. β 208. Probably binary. Motion direct.

1874.2	30.4	1.5 est	1n	β
77.13	31.7	1.71	1	C_4
78.43	33.9	1.37	5	C_5
86.18	42.2	1.27	1	W

376. h 4183. B. A. C. 3130. Change of 15° in position angle since 1835. B. A. C. gives proper motion of principal star +0.ˢ002, —0.″11, but the Cape Catalogues for 1840 and 1880 show no evidence of proper motion:

1835.	142.°6	16.″5 est	2n	h
83.14	157.2	17.71	1	W.

378. Σ 1329. The following are all the measures:

1831.21	245.6	27.68	4n	Σ
35.28	245.8	27.03	3	Σ
63.25	247.3	24.56	1	Eng.
64.73	247.4	23.73	5	De.
78.13	248.4	22.84	1	β
79.21	247.8	22.53	1	Hall
79.22	248.4	22.74	2	C_5
82.15	248.5	22.12	1	W.

The change is probably due to relative proper motion.

395. β 339. Possible change. The only observations are:

1878.53	215.1	1.32	3n	C_5
85.23	220.2	1.50	1	W.

405. A. C. 5. 8 Sextantis. A most difficult double, and probably a rapid binary. The stars have no perceptible proper motion. The measures are all very doubtful, but the distance seems to have decreased, until the star appeared single in 1881, and to be now increasing:

1854.21	50.7	0.55 est	2n	Da.
60.34	38.2	0.5 est	1	Da.
67.08	90.2 :	...	1	H. C. O.
70.27	22.4	0.3 est	2	H. C. O.
78.22	117.7	0.3 est	2	C_5
78.26	161.0 :	0.2 est	2	β
79.21	180. ?	elong.?	1	β
79.23	297.5 :	0.31	1	Hall
79.26	Not seen double		1	Hall
81.34	No elongation		1	β
86.18	132.5 :	0.4 est	2	W.

429. Σ 1416. There seems to have been an increase in the distance, and perhaps also in the angle:

1827.73	275.8	11.25	2n	Σ
67.93	276.9	11.31	4	De.
78.22	276.0	11.64	2	C_5
80.90	276.2	11.61	3	β
82.83	277.2	12.07	3	W.

434. H. A. H. 13. These are the only observations:

1877.29	301.2	2.89	1n	C_4
85.18	306.6	3.36	1	W.

465. Σ 1476. Probably a slow binary. Pretty certain change of angle is indicated by the following measures:

1831.00	353.6	2.27	2n	h.
32.61	353.7	1.89	3	Σ
56.71	357.8	1.82	2	Se.
68.79	357.4	1.94	4	De.
71.31	358.1	2.27	1	O Σ
71.37	357.0	1.90	1	H. C. O.
78.71	358.2	1.94	2	C_5
86.30	1.2	1.93	1	W.

476. Σ 1500. A slow binary. The angle has diminished 15° since 1825. The distance is increasing.

482. H. A. H. 15. The only measures are:

1877.12	329.3	2.55	2n	C_4
85.32	335.8	2.39	1	W.

503. β 601. This is the fainter star of the wide pair H iv. 112. It is probably a rapid binary. The only measures are:

1878.83	229.6	0.77	2n	β
79.73	224.6	0.87	4	C_5
86.31	219.9	1.04	1	W.

The measures of the wide pair are difficult to reconcile:

1783.34	148.7	26.25	1n	H.
1825.2	330.7	29.96	...	S.
1878.34	331.5	28.16	3	β
86.31	330.8	27.69	1	W.

535. β 457. The only previous measures are by Hall, who gives:

1877.37	84.3	0.89	2n

537. Σ 1593. The measures of this pair by Mädler and Secchi disagree with those by other observers. There has probably been no change in either angle or distance:

1829.26	18.2	1.43	3n	Σ
37.45	24.1	1.54	...	Mä.
47.30	28.5	1.89	...	Mä.
56.38	26.6	1.08	1	Se.
66.62	198.3	1.33	3	De.
67.42	19.5	1.24	7	H. C. O.
79.27	18.2	1.36	2	C_5
80.33	18.7	1.34	1	C_6
84.36	19.3	1.46	1	W.

542. Σ 1604. The stars *A* and *B* form a physical pair, having a common proper motion with reference to *C*. The following are all the measures:

A B.

1831.95	93.3	11.98	3n	Σ
56.40	92.8	11.75	1	Se.
65.63	92.5	11.21	7	De.
69.85	91.6	11.37	2	Du.
79.33	91.1	11.32	1	β
79.35	89.7	11.46	1	C_5
84.58	91.4	11.40	2	W.

A C.

1831.95	96.9	58.00	3n	Σ
56.40	95.2	50.38	1	Se.
64.70	94.8	47.61	6	De.
69.85	94.0	45.96	2	Du.
71.17	94.1	45.65	1	De.
79.33	93.3	42.92	1	β
79.35	93.5	43.97	1	C_5
84.58	92.3	42.00	3	W.

553. h 4506. h gives for the angle 15.°8.

554. H. C. W. Follows a 7 mag. star about 2′.

560. β 605. A difficult pair. Doubtful whether any change is indicated by the measures:

1870.27	138.0	1.	1n	H. C. O.
78.24	144.2	1.25	2	β
78.43	136.3	1.01	5	C_5
84.32	133.0	0.5	1	W.

573. Σ 1664. Proper motion, probably of *B*, 0.″167 in direction 199.°5. The meridian observations of *A* by Lalande, Bessel, and Lamont show no change:

1830.23	271.6	17.10	3n	Σ
65.25	254.7	19.44	3	De.
78.81	249.7	21.12	2	C_5
80.32	249.2	21.34	1	C_6
85.31	248.0	21.29	1	W.
86.30	248.4	21.61	1	W.

576. Σ 1670. γ Virginis. A well known binary; period about 185 years.

589. O Σ 256. Probably a binary. One of the stars is possibly variable:

1848.70	57.2	0.66	6n	O. Σ
67.33	61.6	1.12	2	H. C. O.
67.37	242.1	0.50	3	De.
75.36	244.1	0.71	...	Sp.
79.37	64.0	0.77	2	C_5
80.37	245.6	0.81	1	C_6
86.30	247.5	0.82	1	W.

592. A. G. C. 5. An interesting pair, although it is not evident yet whether the star is a binary or not. The larger star was noted as yellowish

red; the smaller star blue. The measures by various observers are somewhat discordant:

1876.41	159.2	1.28	3n	Hall
78.65	147.2	1.23	8	C_5
79.10	151.5	1.44	4	β
79.41	154.4	1.28	3	Hall
80.38	150.5	1.27	3	C_6
84.35	155.6	1.37	1	W.

596. H. A. H. 22. The only measures are:

1877.41	292.2	2.77	2n	C_4
85.32	296.8	2.80	1	W.

617. β 114. Change in angle is doubtful. Excepting Dembowski's measures, the others seem to indicate a gradual increase:

1875.30	137.1	1.49	4n	De.
77.29	132.9	1.39	1	C_4
78.43	135.4	1.40	2	C_5
80.33	137.0	1.50	4	C_6
84.35	138.6	1.53	1	W.
86.30	320.2	1.48	1	W.

634. Σ 1788. A slow binary. The angle has increased 25° in 55 years.

642. h 2692. There must be an error in one of the measures of distance of the wide pair. The closer companion was discovered by myself in 1882.

667. Σ 1837. A physical pair having a common proper motion. The angle seems to be changing slowly:

1829.83	326.9	1.41	4n	Σ
37.48	321.5	1.25	...	h.
48.45	324.5	1.50	1	Mit.
56.47	312.3	1.40	2	Se.
68.23	312.9	1.40	7	De.
71.37	310.6	0.98	1	H. C. O.
77.42	307.0	1.45	2	C_4
79.35	306.8	1.36	3	C_5
79.44	311.7	1.56	1	β
79.44	307.8	1.38	3	Hall
85.85	309.6	1.45	2	W.

674. Σ 1847. Proper motion 0.″126 in direction 108° or 288°. The meridian observations are insufficient to determine which star is moving. The following are all the double star measures:

1829.81	248.4	18.73	4n	Σ
48.45	253.1	20.17	1	Mit.
65.36	256.0	21.66	4	De.
70.10	256.8	21.93	3	De.
78.31	257.8	22.62	2	β
79.25	258.2	23.31	1	C_5
80.37	256.9	23.24	1	C_6
86.35	259.8	23.38	1	W.

676. β 117. A physical pair. Arg. gives proper motion 0.″438 in direction 147.°4. The double star measures do not indicate much change:

1867.38	96.7	2.16	1n	H. C. O.
76.64	95.8	2.44	3	De.
77.11	93.8	2.05	1	C_4
80.38	92.0	2.41	1	C_6
80.33	91.4	2.18	1	β
86.35	93.7	2.58	1	W.

687. Σ 1876. A slow binary. The measures indicate a change of 20° in angle since 1832:

1832.33	51.7	1.18	7n	Σ
48.45	59.8	0.95	1	Mit.
56.88	60.8	1.00	2	Se.
57.46	61.2	1.0	3	De.
63.31	65.8	1.2	3	De.
65.48	63.8	...	1	Se.
65.61	61.7	1.15	5	De.
77.41	67.0	1.40	1	C_4
79.27	69.8	1.09	1	C_5
80.32	70.7	1.26	1	C_6
85.28	72.0	1.33	1	W.

692. Sh. 190. P xiv. 212. This pair resembles very much *61 Cygni*. Both stars have a large proper motion in the same direction, and the brighter is moving a little faster than the fainter. The proper motion of the brighter star is 2.″015 in direction 151.°2; that of the fainter is 1.″882 in the same direction. The following are all the measures:

1806.7	251.4	9.40	...	Pi.
23.32	270.1	10.82	1n	Sh.
33.4	272.6	10.30	1	Sm.
36.66	277.4	11.80	1	h.
56.4	284.0	13.34	...	Ja.
62.62	285.1	...	...	Da.
62.4	285.5	13.36	...	Kr.
64.0	290.8	14.66	...	Bonn
78.35	290.8	15.33	4	β
79.50	289.3	15.40	3	Hall
80.41	289.6	15.15	2	β
81.35	289.5	15.25	1	C_6
81.36	291.3	15.38	4	β
85.32	292.0	15.61	1	W.
86.35	293.0	15.71	1	W.

698. β 239. Probably a binary:

1874.50	303.7	0.8	5n	β
78.36	309.5	0.93	1	β
79.40	130.1	0.89	2	C_5
79.92	311.8	0.83	2	β
80.38	307.4	0.90	4	C_6
81.40	312.0	1.07	4	β
84.40	313.8	1.20	1	W.

705. h 4740. Herschel gives the angle 30°±. He remarks: "Excessively close, if double."

762. H ii. 19. ρ Scorpii. Slow binary:

1782.29	7.9	...	1n	H.
1804.44	7.9	...	1	H.
34.78	1.9	4.11	1	h.
77.50	357.6	3.58	3	C_4
79.36	357.4	3.75	1	C_5
82.48	357.0	3.66	3	W.

772. Σ 3105. Slow change in angle:

1829.31	60.0	0.51	1n	Σ
32.52	58.8	0.3	1	Σ
57.57	58.0	0.73	1	Se.
70.05	53.2	0.5	7	De.
78.49	50.9	0.61	1	β
79.40	40.6	0.52	3	C_5
80.38	42.7	0.72	2	C_6
86.41	41.3	0.74	1	W.

786. H. A. H. 44. If the measure in C_4 is of the same pair, rapid change is indicated:

1877.53	229.7	5.36	1n	C_4
84.38	244.1	5.82	1	W.

788. Σ 2119. Probably a very slow binary:

1831.38	17.8	1.88	2n	Σ
32.52	17.9	2.11	1	Σ
48.60	15.2	2.30	1	Mit.
56.45	14.9	2.14	3	Se.
66.81	15.4	2.05	3	De.
68.54	15.0	1.73	1	H. C. O.
78.51	14.5	1.98	3	C_5
84.46	14.4	1.95	1	W.

843. Σ 2541. Probably slow change in angle and distance, as the following measures will show:

1831.01	340.0	2.84	3n	Σ
48.78	336.2	3.02	2	Mit.
51.86	338.4	3.61	2	Σ
67.90	331.5	3.42	4	De.
79.39	330.5	3.71	4	C_5
83.61	331.4	3.81	2	W.

851. h 2904. B. A. C. 6814. The brighter star has a proper motion of about —0.^{s}010 and —0.″45, or 0.″475 in direction 198.°4, which will

account for the change in relative position of the stars since h's observation:

1831.0	173.5	20. ±	1n	h.
34.6	170.6	20. ±	1	h.
75.1	144.7	...	1	β
77.73	141.4	18.30	2	C_4
78.71	140.8	18.39	1	β
79.48	138.9	18.04	1	C_5
81.55	137.6	17.50	3	β
82.62	135.8	17.26	4	W.
85.63	133.0	16.29	2	W.

976. Sh. 345. 53 Aquarii. Perhaps a slow binary:

1830.67	301.0	9.59	1n	h.
66.60	302.9	8.32	2	H. C. O.
77.70	304.7	7.87	5	C_4
80.56	305.6	7.65	2	C_6
83.70	306.6	7.83	5	W.

999. Σ 2928. A slow binary:

1830.82	327.7	4.70	3n	Σ
48.74	324.2	4.09	1	Mit.
57.40	322.0	4.40	2	Se.
64.15	319.3	4.37	6	De.
77.75	316.8	4.43	3	C_4
79.75	316.0	4.28	16	C_5 & C
79.76	316.6	4.39	2	Hall
83.70	317.7	4.43	5	W.

1082. Σ 3046. Slow binary:

1830.15	232.2	2.52	4n	Σ
51.88	239.4	2.81	1	Σ
57.42	241.2	2.79	2	Se.
63.92	241.0	2.90	2	De.
64.78	242.1	2.88	5	De.
72.69	245.4	2.73	1	De.
77.88	244.2	2.92	1	De.
77.94	244.8	3.05	1	β
79.71	243.7	3.04	5	$C_{5 \text{ and } 6}$
82.70	246.2	3.28	1	W.
85.55	246.7	3.05	3	W.

Observations of the Star Cluster

In the constellation "Sobieski's Shield," R. A. 18h 45m, Decl. −6° 25′.

BY H. C. WILSON.

OBSERVATIONS of this cluster have been published by J. Lamont ("Observationes Astronomicæ," Vol. XI, Munich, 1843, and "Annalen der k. Sternwarte bei München," XVII, 1869), and by F. R. Helmert (Publicationen der Hamburger Sternwarte, No. 1, 1874). Lamont's observations were made during the years 1836 to 1839, with the 11-inch Munich refractor. Helmert observed with a 10-inch refractor, at Hamburg, during the years 1869 and 1870. The former observed only position angles, using the difference of right ascension between two of the brighter stars in the cluster as a base-line for the construction of his chart. The latter measured the difference of right ascension and declination between each star and the principal star of the cluster, as well as a great number of position angles and a few direct measures of distance. His paper contains a careful discussion of the observations, corrections for precession, refraction, and personal error, the definitive coördinates of each star from the principal star, computed from all the observations, a comparison with the measures of Lamont, and an accurate chart of the cluster, containing 139 stars.

The following observations were made during the summer of 1885, between the dates May 8th and August 26th, with the 11-inch refractor of the Cincinnati Observatory. They consist chiefly of measures of position angle. A few direct measures of distance were taken, and a few differences of right ascension and declination between the brighter stars of the cluster. The measures of position angle and distance were made in the same manner as in the measures of double stars. The differences of right ascension and declination were taken without the aid of the driving apparatus, each measure consisting of five sets of transits over two wires, and five bisections with the micrometer wire. All of the observations were made near the meridian, so that but few could be made in any one night.

The filar micrometer and the eye-pieces generally employed have been described in the introduction to the observations of double stars. On one night a periscopic eye-piece, designated *P*, was used. This eye-piece gives a wide field of view, with a magnifying power of 450, but with it the wires can not be illuminated without lighting the whole field of view. It is therefore useless for observations of very faint stars.

Column one gives the numbers used by Helmert to designate the stars; column two, the position of the eyes relative to the line joining the stars; and column three, the letter designating the eye-piece used. The fourth column gives the observed position angles; the fifth the same, corrected for personal error. The corrections were applied according to the formula given in the introduction to the double-star observations. The approximate distances in the sixth column were taken from Helmert's results. Where the decimals of the seconds are given, they are my own measures. The remaining columns give the mean results of my observations, side by side with those of Helmert and Lamont. The position angles inclosed in brackets were measured from Helmert's chart by means of a protractor.

Helmert's Numbers.	Eyes.....	Eye-piece.	Position Angle.		Distance approx.	Comparison of Position Angles.					
			Obs.	Corr.		Wilson.	No. of Obs.	Helmert.	No. of Obs.	Lamont.	No. of Obs.
			°	°	″	°		°		°	
1.1′	n	A	189.5	189.7	6.	192.5	4	192.0	6	192.7	16
	n	III	192.8	193.1							
	n	II	193.9	194.3							
	n	III	192.7	193.0							
1.1″	n	A	153.0	152.6	10.	149.2	4	143.8	4	152.3	7
	n	III	146.7	146.1							
	n	II	148.6	147.8							
	n	III	151.0	150.4							
1.2	p	A	233.4	233.2	77.05	232.8	8	233.4	6	233.3	5
	p	A	233.1	232.9							
	n	III	232.1	232.5							
	p	A	233.2	233.0	76.43						
	p	II	233.3	232.9							
	p	III	232.9	232.6							
	n	III	232.5	232.9							
	n	III	232.4	232.8							
1.3	p	A	245.0	244.9	84.	244.9	1	245.0	5	245.0	4
1.8 1.2	n	A	344.6	344.5	95.	344.5	1	344.4	6	343.4	1
1.13	p	III	278.9	279.0	33.	279.0	1	279.5	4	279.8	11
1.22_1	p	A	95.8	95.8	16.	95.8	1	89.9	2	90.1	1
1.22_2	p	III	85.2	85.2	15.	85.2	1				
1.23	p	A	61.4	61.2		60.2	3	60.6	4	61.8	10
	p	III	60.0	59.7							
	p	A	59.9	59.7	25.40						
1.24	n	II	153.9	153.9	298.	153.9	1	[153.9]			
1.25	n	II	148.1	148.1	267.	148.1	1	[148.0]			
1.26	p	III	145.9	145.5	70.	145.8	2	145.7	3	145.3	3
	p	III	146.4	146.0							

Helmert's Numbers.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance approx.	Comparison of Position Angles. Wilson.	No. of Obs.	Helmert.	No. of Obs.	Lamont.	No. of Obs.
			°	°	//	°		°		°	
1.38$_1$	n	III	30.7	31.0	66.	31.0	1	[31.5]			
1.38$_{1.2}$	p	A	31.6	31.3	67.59	31.4	2	[32.5]			
	n	A	31.3	31.5							
1.39	p	III	165.0	165.3	173.	165.3	1	166.3	7	166.1	2
1.40	p	III	148.0	148.3	142.	148.3	1	148.1	1	148.6	1
1.42	n	A	343.3	343.1	19.	342.1	2	342.0	2	342.4	20
	n	III	341.4	341.1							
1.43	n	III	214.6	214.9	54.	214.9	1	214.7	1	215.3	1
1.44	n	III	197.8	198.0	46.	197.6	2	196.5	1	201.5	1
	n	III	197.1	197.3							
1.45	n	III	178.8	178.8	57.	178.8	1	177.5	1	180.4	1
1.46	n	III	175.2	175.2	64.	175.2	1	174.6	1	175.5	1
1.47	n	III	181.3	181.3	37.	180.9	2	178.8	1	184.6	1
	n	III	180.5	180.5							
1.48	n	II	183.9	183.9	27.	184.9	2	182.7	1	184.1	3
	n	III	185.9	185.9							
1.49$_1$	p	A	233.6	233.4	38.32	233.4	2	230.7	1	233.9	1
	n	III	232.9	233.4							
1.50	p	A	248.8	248.7	38.	248.7	1	248.5	1	248.9	4
1.69	p	III	281.2	281.2	65.	281.2	1	280.6	3	281.3	1
1.70	p	A	291.6	291.7	72.	291.3	2	291.3	1	291.2	1
	p	III	290.8	291.0							
1.71	p	III	293.9	294.1	61.	294.1	1	294.9	1	294.5	2
1.72	p	III	298.2	298.4	74.	298.4	1	299.0	1	297.2	1
1.90	p	III	114.6	114.7	121.	115.4	2	116.4	4	117.0	5
	p	III	115.9	116.0							
1.93	p	III	96.3	96.3	99.	96.3	1	96.1	c	96.8	3
1.95	p	III	88.6	88.6	94.	88.6	1	87.7	c	90.0	1
2.3	n	A	306.6	306.1	19.	306.2	2	306.3	8	305.2	9
	p	III	305.8	306.2							
2.8$_{1.2}$	n	A	14.7	14.7	140.	14.7	1	[15.2]			
2.13	n	III	29.1	29.3	57.	29.3	1	[29.3]			
2.24	p	III	138.4	138.6	290.	138.6	1	[138.9]			
2.25	p	III	131.1	131.3	268.	131.3	1	[131.6]			

Helmert's Numbers.	Eyes.....	Eye-piece.	Position Angle. Obs.	Position Angle. Corr.	Distance approx.	Comparison of Position Angles. Wilson.	No. of Obs.	Helmert.	No. of Obs.	Lamont.	No. of Obs.
			°	°	//	°		°		°	
2.26	p	III	96.4	96.4	98.	96.4	1	[97.3]			
2.39	p	III	139.4	139.6	160.	139.6	1	139.8	4	140.2	3
2.40	p	III	117.9	118.0	154.	118.0	1	118.8	c	118.4	1
2.47	p	III	81.2	81.2	60.	81.2	1	[82.5]			
2.49$_1$	p	A	52.4	52.2	37.67	53.0	2	[53.2]			
	n	III	53.3	53.8							
2.50	p	A	37.6	37.3	40.83	37.3	1	[37.6]			
2.70	n	A	352.8	352.8	74.	352.8	1	[353.8]			
7.93	n	III	190.5	190.5	60.	190.5	1	190.0	1	189.2	1
8$_1$.8$_2$	p	II	249.9	248.8	3.31	248.8	1	244.9	3	249.9	17
8$_{1.2}$.34	p	A	62.5	62.4	83.	62.4	1	[63.0]			
8$_{1.2}$.70	n	A	212.6	212.8	75.	212.8	1	[214.0]			
8$_{1.2}$.38$_{1.2}$	p	A	120.0	120.1	71.20	120.1	1	[120.5]			
23.42	p	III	279.6	279.7	30.	279.7	1	279.5	2	279.9	6
24.25	n	II	15.1	15.3	41.	15.3	1	[14.5]			
26.90	p	III	85.6	85.5	70.	85.5	1	[86.0]			
38$_1$.38$_2$	p	III	256.8	256.4		254.7	3	76.1	5	74.6	10
	p	II	254.6	254.0	5.29						
	p	III	74.0	73.6							
38$_{1.2}$.7	p	III	95.9	95.9	76.	95.9	1	[95.6]			
38$_{1.2}$.70	p	A	253.3	253.2	105.	253.2	1	[253.8]			
45.46	n	III	158.6	158.2	9.	158.2	1	154.5	1	156.8	9
47.26	p	III	118.8	118.3	44.	118.3	1	[118.5]			
47.48	n	III	353.3	353.2	10.	353.2	1	356.2	1	355.3	12
47.49$_1$	p	III	295.7	295.8	38.	295.8	1	[293.8]			
48.50	p	III	291.1	291.2	43.	291.2	1	[290.5]			
50.49$_1$	n	III	147.0	146.6	11.	146.6	1	150.4	1	153.5	3
93.90	n	III	167.0	166.9	44.	166.9	1	[167.0]			
94.93	n	III	160.4	160.2	15.	160.2	1	161.0	1	158.4	1

These observations indicate no change of position, except, perhaps, in the case of the star designated 49_1 and 90. The evidence in both of these cases is, however, very slight.

DIFFERENCES OF RIGHT ASCENSION AND DECLINATION.

Helmert's Numbers.	Wilson.		Eye-piece.	Helmert.	
	$\triangle a$	$\triangle \delta$		$\triangle a$	$\triangle \delta$
	//	//		//	//
1.2	— 61.8	— 45.66	A	— 61.72	— 46.35
		— 46.41	P		
1.5	—121.8	+ 77.40	A	—121.44	— 77.57
		+ 76.75	P		
$1.8_{1.2}$	— 28.6	+ 92.06	A	— 25.20	— 91.62
1.11	—117.0	...	A	—116.18	— 62.05
1.14	—207.9	— 3.20	A	—208.71	— 2.61
1.20	—189.4	+ 58.47	A	—189.71	+ 60.96
		+ 59.06	P		
1.24	...	—278.9*	P	+131.21	—266.22
1.25	...	—224.9	P	+141.33	—226.19
1.29_1	— 84.3	+159.05	A	— 83.72	+159.21
		+154.34	P		
$1.38_{1.2}$	— 34.0	+ 56.96	A	— 36.05	+ 56.46
1.56	—196.2	— 83.02	A	—197.73	— 82.80
		— 81.40	P		
1.102	—307.8	— 29.92	A	—308.91	— 29.56
1.109	—252.9	+ 75.64	A	—254.32	+ 77.00
		+ 75.10	P		

* Probably an error of one Rev. = 13.59″.

ESTIMATES OF MAGNITUDE.

Helmert's Numbers.	Wilson.		Helmert.		
	m	m′	m_o	m_o—m	m_o—m′
1	9.5	9.2	9.0	—0.5	—0.2
25	9.7	9.3	9.3	—0.4	0.0
24	10.0	9.5	9.4	—0.6	—0.1
2	11.0	10.1	10.2	—0.8	+0.1
45	11.4	10.3	10.6	—0.8	+0.3
23	11.5	10.4	10.4	—1.1	0.0
46	11.5	10.4	10.7	—0.8	+0.3
47	11.5	10.4	10.7	—0.8	+0.3
48	11.5	10.4	10.7	—0.8	+0.3
44	11.7	10.5	10.6	—1.1	+0.1
50	11.7	10.5	10.7	—1.0	+0.2
13	12.0	10.7	10.5	—1.5	—0.2
43	12.0	10.7	10.6	—1.4	—0.1
49	12.0	10.7	10.7	—1.3	0.0
21	12.5	11.0	11.0	—1.5	0.0
26	12.5	11.0	10.8	—1.7	—0.2

My estimates of magnitude were made upon only one night, and with a magnifying power of 450. They are given in the column marked *m*. The column *m′* gives the same estimates reduced to Helmert's scale of magnitudes by the formula

$$m' = m - 0.1 - 0.4\,(m - 9.0).$$

The residuals in the last column show that the estimates, when thus reduced, agree remarkably well with Helmert's results. Helmert's scale is approximately that of Struve, while mine is near that of Argelander.

The position of the principal star (1) of the cluster needs to be redetermined. The following are all of the observations which I have been able to collect:

a 1885.0	*δ* 1885.0	Authority.
H. M. S.	° ′ ″	
18 44 57.68	—6 24 46.2	Weisse's Bessel; 1 obs., about 1825
18 44 57.7	—6 24 32.6	Herschel's Sweeps; 8 obs., about 1830
18 44 57.93	—6 24 43.9	Lamont's Zones; 5 obs., about 1850
18 44 57.90	—6 24 08.3	D'Arrest; 3 equatorial obs., about 1855
18 44 57.62	...	Helmert; 1 obs., 1870.

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